

Sparse Satellite Clusters



- Advantages of Space borne Radar
- Size-Weight-Power Tradeoff
- Ambiguity and Resolution
- Cluster of Satellites called Constellation
- >Advantages of Multiple Satellites
- Sparsely Populated Multiple Aperture Spaceborne Radar







Earlier Proposed Filters

- Matched or Correlation Filter
 Estimator Maximizes signal to noise
 Unable to Minimize error due to clutter
- Maximum Likelihood Estimator
 Able to Minimize error due to clutter
 Unable to minimize error due to noise
- Minimum Mean Square Estimator (MMSE) Reduces Interference (Clutter +Noise) Optimal estimate Computational load









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tion of the Radar System	 The received signal for the Radar Constellation can be modeled mathematically. 	 This response depends on radar system parameters, propagation, scattering 	characteristics of the surface.	 Signals can be approximately represented by sampled data and interpolation filters can be used to reconstruct the signal 	 The radar response model can thus be represented with vector-matrix relations. 	g
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$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\gamma} \end{bmatrix} \text{ is the error correlation matrix} \\ \mathbf{K}_{n} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\gamma} \end{bmatrix} \text{ is the error correlation matrix} \\ \mathbf{W}_{n} \text{ is the noise covariance matrix} \\ (.)^{u} \text{ is the conjugate transpose} \end{bmatrix} $ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathrm{E} \{ \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\alpha} \text{ is the noise covariance matrix}$ $(\cdot)^{\mathrm{u}} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{U}} \text{ is the conjugate transpose}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathrm{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{n} \text{ is the noise covariance matrix}$ $(\cdot)^{n} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{U}} \text{ is the conjugate transpose}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathbf{E} \begin{bmatrix} \gamma \\ \gamma \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{n} \text{ is the noise covariance matrix}$ $(.)^{\mathrm{n}} \text{ is the conjugate transpose}$ $(.)^{\mathrm{n}} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$
$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathrm{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\alpha} \text{ is the noise covariance matrix}$ $(\cdot)^{\mathrm{u}} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \{ \gamma \gamma \} $ is the error correlation matrix $\mathbf{K}_{\mathbf{r}} = \mathbf{E} \{ \gamma \gamma \} $ is the noise covariance matrix $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \{ \gamma \gamma \} $ W	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathrm{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix}$ is the error correlation matrix $\mathbf{K}_{\mathrm{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix}$ is the error correlation matrix $\mathbf{K}_{\mathrm{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix}$ is the onise covariance matrix $(\mathbf{j})^{\mathrm{n}}$ is the conjugate transpose $(\mathbf{j})^{\mathrm{n}}$ is the conjugate transpose $\mathbf{W}_{\mathrm{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \mathbf{E} \mathbf{K}_{\mathrm{r}} \mathbf{E} \mathbf{E} \begin{bmatrix} \gamma \gamma \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{K}_{\mathrm{r}} \mathbf{E} \mathbf{E} \begin{bmatrix} \gamma \gamma \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{K}_{\mathrm{r}} \mathbf{E} \mathbf{E} \begin{bmatrix} \gamma \gamma \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \begin{bmatrix} \gamma \gamma \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$ $\mathbf{K}_{s} = \mathrm{E} \{ \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{s} \text{ is the noise covariance matrix}$ $(.)^{u} \text{ is the conjugate transpose}$ $(.)^{u} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$
$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{\mathrm{r}} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \end{bmatrix} $ $\mathbf{W}_{\mathrm{r}} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\tau} \end{bmatrix} $ \mathbf{W}_{r}	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{\eta} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathrm{E} \{ \gamma \rangle^{2} \text{ is the error correlation matrix}$ $\mathbf{K}_{\alpha} \text{ is the noise covariance matrix}$ $\mathbf{K}_{\alpha} \text{ is the noise covariance matrix}$ $(\cdot)^{m} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} \text{ computational load involved due to inverse}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{K}_{\gamma} = \mathrm{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\alpha} \text{ is the noise covariance matrix}$ $(\cdot)^{\mathrm{n}} \text{ is the conjugate transpose}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$ $\overset{A \text{ priori estimates of SNR can be used to construct the MMSE filter.}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{MMSE} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathrm{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{n} \text{ is the noise covariance matrix}$ $(\cdot)^{u} \text{ is the conjugate transpose}$ $\mathbf{W}_{r} = \mathrm{E} \{ \gamma \gamma \} \text{ is the conjugate transpose}$ $\mathbf{W}_{r} = \mathrm{E} \{ \gamma \gamma \} \text{ is the conjugate transpose}$ $\mathbf{W}_{r} = \mathrm{E} \{ \gamma \gamma \} \text{ is the conjugate transpose}$
$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathbf{N}} \end{bmatrix}^{-1} $ the MMSE filter. $\mathbf{K}_{\mathbf{y}} = \mathbf{E} \{ \gamma \} \text{ is the error correlation matrix} $ $\mathbf{K}_{\mathbf{x}} \text{ is the noise covariance matrix} $ $(\cdot)^{\mathrm{u}} \text{ is the conjugate transpose} $ $(\cdot)^{\mathrm{u}} \text{ is the conjugate transpose} $ $(\cdot)^{\mathrm{u}} \text{ is the conjugate transpose} $	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{Y}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\mathbf{Y}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{W}_{\mathbf{Y}} = \mathbf{W}_$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{H} \mathbf{P} \mathbf{MNSE} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{n} \text{ is the noise covariance matrix}$ $\mathbf{V}_{n} \text{ is the conjugate transpose}$ $\mathbf{H} \text{ uge computational load involved due to inverse}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{H} \mathbf{P} \mathbf{MMSE} \text{ filter.}$ $\mathbf{K}_{\gamma} = \mathbf{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{n} \text{ is the noise covariance matrix}$ $(\cdot)^{n} \text{ is the conjugate transpose}$ $\mathbf{H} \text{ uge computational load involved due to inverse}$
$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $\mathbf{W}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \end{bmatrix} $ $\mathbf{F}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \end{bmatrix} $ $\mathbf{W}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \end{bmatrix} $ $\mathbf{W}_$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\gamma} = \mathbf{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\gamma} \text{ is the noise covariance matrix}$ $\mathbf{V}_{\gamma} \text{ is the noise covariance matrix}$ $\mathbf{U}^{\mathbf{H}} \text{ is the conjugate transpose}$ $\mathbf{U}^{\mathbf{H}} \text{ is the conjugate transpose}$ $\mathbf{W}_{\gamma} = \mathbf{E} \{ \gamma \gamma \} \text{ is the conjugate transpose}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\gamma} = \mathbf{E} \{ \gamma \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{s} = \mathbf{E} \{ \gamma \gamma \} \text{ is the noise covariance matrix}$ $\mathbf{K}_{s} \text{ is the noise covariance matrix}$ $(\cdot)^{\text{"}} \text{ is the conjugate transpose}$ $(\cdot)^{\text{"}} \text{ is the conjugate transpose}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \mathbf{K}_{\gamma} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \mathbf{K}_{\gamma} = \mathbf{E} \{ \gamma \gamma \}$ is the error correlation matrix $\mathbf{K}_{\alpha} = \mathbf{E} \{ \gamma \gamma \}$ is the noise covariance matrix $\mathbf{K}_{\alpha} = \mathbf{E} \{ \gamma \gamma \}$ is the noise covariance matrix $(\cdot)^{\mathbf{H}}$ is the conjugate transpose $(\cdot)^{\mathbf{H}}$ is the conjugate transpose $(\cdot)^{\mathbf{H}}$ is the conjugate transpose $(\cdot)^{\mathbf{H}}$
$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{A}$ $\mathbf{P} \text{ if the indices of SNR can be used to construct the MMSE filter. \mathbf{K}_{\gamma} = \mathbf{E} \{ \gamma \gamma \} \text{ is the error correlation matrix} \mathbf{K}_{n} \text{ is the noise covariance matrix} (\cdot)^{u} \text{ is the conjugate transpose} \mathbf{H} \text{ uge computational load involved due to inverse}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\gamma} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{n} \text{ is the noise covariance matrix}$ $\mathbf{V}_{n} \text{ is the conjugate transpose}$ $\mathbf{U}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\mathbf{r}} \mathbf{P} \mathbf{H}_{\mathbf{r}} \mathbf{R}_{\mathbf{r}} \\ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\mathbf{r}} \mathbf{P} \mathbf{H}_{\mathbf{r}} \mathbf{R}_{\mathbf{r}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{r}} \text{ is the noise ovariance matrix}$ $\mathbf{U}_{n} \text{ is the conjugate transpose}$ $\mathbf{U}_{\mathbf{r}} \text{ is the conjugate transpose}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{F}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{Y}} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{x}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{Y}} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{x}} \text{ is the noise covariance matrix}$ $(.)^{\mathbf{H}} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} = \mathbf{C} \text{ computational load involved due to inverse}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\gamma} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{\sigma} \text{ is the noise covariance matrix}$ $\mathbf{K}_{\sigma} \text{ is the noise covariance matrix}$ $(.)^{\mathrm{u}} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} = \mathbf{C} = \mathbf{C} + C$
$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{H}_{\mathbf{P}} \mathbf{H}_{\mathbf{n}} = \mathbf{H}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{H}_{\mathbf{P}} \mathbf{H}_{\mathbf{N}} \mathbf{H}_{\mathbf{n}} = \mathbf{H}_{\mathbf{P}} \mathbf{H}_{\mathbf{n}} \mathbf{H}_{\mathbf{n}}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{I}_{\mathbf{\mu}} \mathbf{P} \mathbf{M} \mathbf{MSE}$ filter. $\mathbf{W}_{\mathbf{\mu}} = \mathbf{E} \{ \mathbf{\gamma}^{\mathbf{\gamma}} \}$ is the error correlation matrix $\mathbf{K}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{\gamma}^{\mathbf{\gamma}} \}$ is the onise covariance matrix $\mathbf{K}_{\mathbf{n}} $ is the noise covariance matrix $\mathbf{V}_{\mathbf{n}} $ is the conjugate transpose $(\cdot)^{\mathbf{n}} $ is the conjugate transpose $\mathbf{H} \mathbf{u} \mathbf{g} $ computational load involved due to inverse $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ estimates of SNR can be used to construct $\mathbf{W}_{\gamma} = \mathbf{E} \{ \gamma \gamma \}$ is the error correlation matrix $\mathbf{K}_{\alpha} \text{ is the noise covariance matrix}$ $\mathbf{V}_{\alpha} \text{ is the noise covariance matrix}$	$\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{Y}} = \mathbf{E} \{ \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{x}} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{x}} \text{ is the noise covariance matrix}$ $(\cdot)^{\mu} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} \text{ is the conjugate transpose}$
$ \mathbf{\dot{\gamma}} = \mathbf{W} \mathbf{r} $ estimator matrix w $ \mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I} $ estimates of SNR can be used to construct the MMSE filter. $ \mathbf{K}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the error correlation matrix $ \mathbf{K}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the error correlation matrix $ \mathbf{K}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the noise covariance matrix $ \mathbf{V}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the noise covariance matrix $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the conjugate transpose $ \mathbf{V}_{\mathbf{v}} = \mathbf{W} = \mathbf{E} \left\{ \gamma \gamma \right\} $ where $\mathbf{E} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the noise covariance matrix $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the conjugate transpose $ \mathbf{V}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the conjugate transpose $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $	$ \vec{\gamma} = \mathbf{W} \mathbf{r} $ estimator matrix w $ \mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \right]^{-1} $ $ \mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{n} \right]^{-1} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the error correlation matrix $ \mathbf{K}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the noise covariance matrix $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the noise covariance matrix $ (\cdot)^{\mathbf{u}} $ is the conjugate transpose $ (\cdot)^{\mathbf{u}} $ is the conjugate transpose $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \mathbf{W} \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma 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\gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{v}} = \mathbf$	$ \vec{\gamma} = \mathbf{W} \mathbf{r} $ where $\mathbf{V} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ estimator matrix w $ \mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix} $ is the error correlation matrix $ \mathbf{K}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix} $ is the error correlation matrix $ \mathbf{K}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \gamma \end{bmatrix} $ is the conjugate transpose $ (\cdot)^{n} \text{ is the conjugate transpose} $ $ \mathbf{H}_{\mathbf{Q}} = \text{Computational load involved due to inverse} $	$ \vec{\gamma} = \mathbf{W} \mathbf{r} $ $ \mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} $ $ \mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the error correlation matrix $ \mathbf{K}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ is the noise covariance matrix $ (\cdot)^{\mathrm{u}} $ is the conjugate transpose $ (\cdot)^{\mathrm{u}} $ is the conjugate transpose $ \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} \mathbf{E} \left\{ \mathbf{W}_{\mathbf{r}} \mathbf{E} \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} $ $ \mathbf{W}_{\mathbf{r}} = 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$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{W} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} W$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ estimator matrix w $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathrm{r}} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\}$ is the error correlation matrix $\mathbf{K}_{s} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\}$ is the noise covariance matrix $\langle \cdot \rangle^{\mathrm{u}}$ is the conjugate transpose $\langle \cdot \rangle^{\mathrm{u}}$ is the conjugate transpose $\mathbf{H}_{\mathrm{uge}}$ computational load involved due to inverse	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\boldsymbol{n}} \end{bmatrix}^{-1}$ estimator matrix w $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\boldsymbol{n}} \end{bmatrix}^{-1}$ $\stackrel{\bullet}{=} \mathbf{K}_{\boldsymbol{\gamma}} = \mathbf{E} \begin{bmatrix} \boldsymbol{\gamma}_{\boldsymbol{\gamma}} \end{bmatrix}$ is the error correlation matrix $\mathbf{K}_{\mathrm{u}} = \mathbf{E} \{ \boldsymbol{\gamma}_{\boldsymbol{\gamma}} \}$ is the noise covariancematrix $(.)^{\mathrm{u}}$ is the conjugate transpose $(.)^{\mathrm{u}}$ is the conjugate transpose $(.)^{\mathrm{u}}$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{N}} = \mathbf{F} \begin{bmatrix} \mathbf{Y}_{\mathbf{\gamma}} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{n}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{\gamma}} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{K}_{\mathbf{n}} \text{ is the noise covariance matrix}$ $(\cdot)^{\mathbf{n}} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} = \text{computational load involved due to inverse}$
$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{r}^{1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{r}^{1}$ $\mathbf{W}_{\mathbf{P}} = \mathbf{F} \left\{ \gamma \mathbf{r} \right\} \text{ is the error correlation matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{r} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{r} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{r} \right\} \text{ is the noise covariance matrix } 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matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{r} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{r} \right\} \text{ is the noise covariance matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of noise of \mathbf{r} \right\} = \mathbf{E} \left\{ \gamma \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} \text{ is the noise of random matrix } \mathbf{P} \left\{ \mathbf{r} \right\} 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\mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{r}^{1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{r}^{1}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix} \mathbf{K}_{\mathbf{a}} \text{ is the noise covariance matrix} \mathbf{r}^{-1} \mathbf$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{\gamma}} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{\gamma}} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{K}_{\mathbf{r}} \text{ is the noise covariance matrix}$ $(.)^{u} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} \text{ computational load involved due to inverse}$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{r}^{1}$ estimator matrix w $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{r}^{1}$ $\mathbf{P} \mathbf{W}_{\mathbf{p}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{P}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{P}} \mathbf{P}^{\mathbf{H}} \mathbf{P} \mathbf{K}_{\mathbf{n}} = \mathbf{F}_{\mathbf{P}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{p}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{P}} \mathbf{P}^{\mathbf{H}} \mathbf{P} \mathbf{R}_{\mathbf{n}} \mathbf{P}^{\mathbf{H}} \mathbf{P}^{H$
$\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix w}$ $\mathbf{K}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \mathbf{W}_{\mathbf{r}} =$	$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{\gamma}} \end{bmatrix} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{\gamma}} \end{bmatrix} \text{ is the onise covariance matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \begin{bmatrix} \mathbf{Y}_{\mathbf{r}} \end{bmatrix} \text{ is the conjugate transpose}$ $(.)^{u} \text{ is the conjugate transpose}$ $(.)^{u} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\mathbf{W} \mathbf{MMSE} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{\boldsymbol{M}} \right]^{-1} \mathbf{I}$ $\mathbf{W} \text{ estimator matrix w}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W} \text{ is the error correlation matrix}$ $\mathbf{W} \text{ is the noise covariance matrix}$ $\mathbf{W} \text{ is the conjugate transpose}$ $\mathbf{W} \text{ end to conjugate transpose}$ $\mathbf{W} \text{ end to construct the transpose}$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix W}$ $\mathbf{K}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix W}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$
$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\boldsymbol{n}} \right]^{-1} \mathbf{I}$ where $\mathbf{R}_{\mathrm{F}} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\boldsymbol{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{E} \left[\mathbf{W} \right] \mathbf{E} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{E} = \mathbf{E} \left\{ \mathbf{W} \right\} \mathbf{E} \mathbf{R}_{\boldsymbol{\gamma}} \mathbf{E} \mathbf{R}_{\mathrm{F}} \mathbf{R}_{\mathrm{H}} \mathbf{R}_{\boldsymbol{\mu}} \mathbf{R}_{\boldsymbol{\mu}}$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\boldsymbol{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the noise covariance matrix } \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the onise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} \text{ is the noise covariance matrix } \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} \text{ is minimum estimation error.}$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\boldsymbol{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{F} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{F} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{F} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{F} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{F} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{F} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{r}} \mathbf{P}^{\mathbf{H}} \mathbf{P} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} R$	$\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\boldsymbol{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\boldsymbol{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \{ \gamma \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{r}} = \mathbf{E} \{ \gamma \} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} \text{ is the noise covariance matrix}$ $(.)^{u} \text{ is the conjugate transpose}$ $\mathbf{H}_{\mathbf{U}} \text{ computational load involved due to inverse}$
$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathrm{eight vector is a compromise between noise and cutter.}$ $\mathbf{K}_{*} = \mathrm{E} \{ \gamma \gamma \}$ is the error correlation matrix $\mathbf{K}_{*} = \mathrm{E} \{ \gamma \gamma \}$ is the conjugate transpose $(.)^{\mathrm{m}}$ is the conjugate transpose $(.)^{\mathrm{m}}$ is the conjugate transpose $\mathbf{W}_{\mathrm{m}} = \mathbf{W}_{\mathrm{m}} \mathbf{W}_{\mathrm{m}} = \mathbf{W}_{\mathrm{m}} = \mathbf{W}_{\mathrm{m}} \mathbf{W}_{\mathrm{m}} = \mathbf{W}_$	$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W} = \mathbf{W}\mathbf{r}$ $\mathbf{W} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\boldsymbol{M}} \end{bmatrix}^{-1}$ $\mathbf{W} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\boldsymbol{M}} \end{bmatrix}^{-1}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the error correlation matrix W}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the error correlation matrix}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the onise covariance matrix}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the conjugate transpose}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the conjugate transpose}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the conjugate transpose}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the conjugate transpose}$ $\mathbf{W} = \mathbf{E} \{ \mathcal{M} \} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{E} \left\{ \mathbf{W}_{\mathbf{\gamma}} \right\} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{n}} \text{ is the noise covariance matrix}$ $(.)^{\mathbf{n}} \text{ is the conjugate transpose}$ $(.)^{\mathbf{n}} \text{ is the conjugate transpose}$ $(.)^{\mathbf{n}} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{E} \left\{ \mathbf{W}_{\mathbf{\gamma}} \right\} \text{ is the error correlation matrix}$ $\mathbf{K}_{a} \text{ is the noise covariance matrix}$ $(.)^{u} \text{ is the conjugate transpose}$ $(.)^{u} \text{ is the conjugate transpose}$ $(.)^{u} \text{ is the conjugate transpose}$
$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the error correlation matrix}$ $\mathbf{K}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the noise covariance matrix}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{E} \{ \mathbf{M}^{\mathbf{T}} \} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{n}} = \mathbf{W}_{\mathbf{n}} = $	$\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ estimator matrix w $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} \mathbf{r}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \mathbf{P}^{\mathbf{H}} \mathbf{P}^{\mathbf{H}} \mathbf{R}_{\mathbf{M}} \mathbf{r}$ $\mathbf{W}_{\mathbf{NMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \mathbf{P}^{\mathbf{H}$	$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}^{-1}$ $\mathbf{W}_{\mathbf{\gamma}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{\gamma}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{\gamma}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} \end{bmatrix}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{E}\{\mathbf{W}\}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf{H}} + \mathbf{E}_{\mathbf{M}}\mathbf{P}^{\mathbf$	$\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{W}
$\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{V} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} W$	$\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{\text{MMSE}} = \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\text{H}} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\text{H}} + \mathbf{K}_{\boldsymbol{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\text{minimum estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{K}_{\boldsymbol{\gamma}} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\mathbf{K}_{\boldsymbol{\alpha}}$ $\mathbf{K}_{\boldsymbol{\alpha}} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the noise covariance matrix $(\cdot)^{\text{u}}$ is the conjugate transpose $(\cdot)^{\text{u}}$ is the conjugate transpose $\mathbf{W}_{\text{minimum estimation error}.$	$\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{P}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{P}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{P}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{P}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \mathbf{N}$ $\mathbf{W}_{\mathbf{P}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \mathbf{P}^{\mathbf{H}} \mathbf{P}^{$	$\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{l}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}} \right]^{-1}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}} = \mathbf{W}_{\mathbf{r}}$
$\gamma_{i} = W_{i} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = W_{i} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{r}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{P} \mathbf{r}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{P} \mathbf{r}$ \mathbf{W}_{i} \mathbf{r} $\mathbf{P} \mathbf{r}$ $\mathbf{P} \mathbf{P} \mathbf{P}$ $\mathbf{P} \mathbf{P} \mathbf{r}$ $\mathbf{P} \mathbf{P} \mathbf{P}$ $\mathbf{P} \mathbf{P} \mathbf{P}$ $\mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P}$ $\mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} $	$\gamma_{i} = \mathbf{W}_{i} \mathbf{T}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \text{ filter.}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma' \} \text{ is the error correlation matrix}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma' \} \text{ is the noise covariance matrix}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma' \} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{W}_{i} \text{ is the noise transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} = $	$\gamma_{i} = \mathbf{W}_{i} \mathbf{T}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{P}^{H} \mathbf{E} \mathbf{H}_{i}$ $\mathbf{W}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix W}$ $\mathbf{W}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \mathbf{H}_{i} \mathbf{E} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$	$\gamma_{i} = \mathbf{W}_{i} \mathbf{T}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\mathbf{K}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $(.)^{u}$ is the conjugate transpose $(.)^{u}$ is the conjugate transpose $\mathbf{W}_{i} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$
$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{\Gamma}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{\Gamma}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{W}}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{D}}^{H} + \mathbf{K}_{i}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{D}}^{H} + \mathbf{K}_{i}$ $\mathbf{W}_{\mathbf{D}}^{H} = \mathbf{W}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} + \mathbf{K}_{i}$ $\mathbf{W}_{\mathbf{D}}^{H} = \mathbf{W}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} + \mathbf{K}_{i}$ $\mathbf{W}_{\mathbf{D}}^{H} = \mathbf{W}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} + \mathbf{W}_{i}$ $\mathbf{W}_{\mathbf{D}}^{H} = \mathbf{W}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} + \mathbf{W}_{i}$ $\mathbf{W}_{\mathbf{D}}^{H} = \mathbf{W}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} + \mathbf{W}_{i}$ $\mathbf{W}_{\mathbf{D}}^{H} = \mathbf{W}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^{H} \mathbf{E}_{\mathbf{D}}^$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{W}}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{W}_{i} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{W}_{i} \mathbf{P}^{\mathrm{H}} \mathbf{P}^{\mathrm{H}} \mathbf{W}_{\mathbf{MSE}} = \mathbf{W}_{i} \mathbf{P}^{\mathrm{H}} \mathbf{W}_{\mathbf{MSE}} \mathbf{P}^{\mathrm{H}} \mathbf{P}^{\mathrm{H}} \mathbf{W}_{\mathbf{MSE}} \mathbf{P}^{\mathrm{H}} $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{\Gamma}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{\Gamma}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\frac{A \text{ priori estimates of SNR can be used to construct the satimates of SNR can be used to construct the MMSE filter.$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma' \} \text{ is the error correlation matrix w}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma' \} \text{ is the error correlation matrix}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma' \} \text{ is the conjugate transpose}$ $(.)^{"} \text{ is the conjugate transpose}$ $\mathbf{H}_{i} = \mathbf{M}_{i} =$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{W}}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma \} \text{ is the error correlation matrix w}$ $\mathbf{W}_{i} = \mathbf{E} \{ \gamma \} \text{ is the conjugate transpose}$ $\{ \mathbf{W}_{i} \text{ is the conjugate transpose}$ $\{ \mathbf{W}_{i} \text{ is the conjugate transpose}$ $\{ \mathbf{W}_{i} \text{ is the conjugate transpose}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{\mu} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{w}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mu} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mu} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mu} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mu} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\mathbf{K}_{r} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the noise covariance matrix $\hat{\mathbf{K}}_{n} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $\hat{\mathbf{U}}_{\mathbf{r}}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\}$ $\mathbf{W}_{\mathbf{r}} = \mathbf{E} $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} \mathbf{H}_{\mathbf{H} \mathbf{I}} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I}} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I}} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{M} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} I$	$\begin{aligned} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{H} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \end{aligned}$ SAR processing estimates the scattering from each resolution cell and involves with finding the optimal estimator matrix w $\mathbf{W}_{\mathbf{MMSE}} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{W}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{W}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I} \end{aligned}$ $\mathbf{W}_{\mathbf{MMSE}} \mathbf{H} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} I$	$\dot{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\dot{\gamma} = \mathbf{W}\mathbf{r}$ $\dot{\gamma} = \mathbf{W}\mathbf{r}$ $\dot{\gamma} = \mathbf{W}\mathbf{r}$ $\dot{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{W} $$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{w} $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{SE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{SE} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{SE} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} = \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{W}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} $\mathbf{F} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{H} \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{w} $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{W}_{\mathbf{MSE}} \mathbf{P}_{\mathbf{H}} \mathbf{P}_{$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{w} $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\mathbf{T}} = \mathbf{F}_{\mathbf{T}} \mathbf{W}_{\mathbf{T}} \mathbf{P}_{\mathbf{T}} \mathbf{P}_{\mathbf{T}} = \mathbf{W}_{\mathbf{T}} \mathbf{P}_{\mathbf{T}} $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{W}}$ \mathbf{W} \mathbf	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{w}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{V} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{V} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{V} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{V} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} W$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{WMSE}} = \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} \mathbf{I} \mathbf{E} \mathbf{E} \left[\mathbf{P} \mathbf{K}_{\mathbf{Y}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{WSE}} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{E} \left[\mathbf{W}_{\mathbf{Y}} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \left[\mathbf{W}_{\mathbf{Y}} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}MMSE = \mathbf{K}\mathbf{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}MMSE = \mathbf{K}\mathbf{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}MMSE = \mathbf{K}\mathbf{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}MSE = \mathbf{F}\left\{ \gamma \right\}$ is the error correlation matrix w $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E}\left\{ \gamma \right\}$ is the noise covariance matrix $\hat{\boldsymbol{\zeta}}_{i}$ is the noise covariance matrix $\hat{\boldsymbol{\zeta}}_{i}$ is the noise covariance matrix $\hat{\boldsymbol{\zeta}}_{i}$ is the conjugate transpose $\hat{\boldsymbol{\zeta}}_{i}$ $\mathbf{W}MSE = \mathbf{E}\left\{ \gamma \right\}$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{H} \mathbf{W} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{U} \mathbf{I} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} I$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ \mathbf{w} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \{ \mathbf{W} \} \text{ is the error correlation matrix} \mathbf{K}_{\alpha} = \mathbf{E} \{ \mathbf{W} \} \text{ is the error correlation matrix} \mathbf{K}_{\alpha} = \mathbf{E} \{ \mathbf{W} \} \text{ is the conjugate transpose}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{w} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{R} \mathbf{E}$ $\mathbf{H} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{E}$ $\mathbf{H} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} R$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} 1^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} 1^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} 1^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1} 1^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{M}} \right]^{-1}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \mathbf{E} \mathbf{filter}.$ $\mathbf{W}_{\mathbf{\gamma}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}_{\mathbf{\gamma}} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{w} $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{\sim} \mathbf{I}$ \mathbf{W} $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{\sim} \mathbf{I}$ \mathbf{W} $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{\sim} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{\sim} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{\sim} \mathbf{I}$ $\mathbf{W}_{\mathbf{MMSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{\sim} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{P}^{\mathrm{H}} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{P}^{\mathrm{H}} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{I} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{W}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{I}$ $\mathbf{W}_{\mathbf{MSE}} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \mathbf{H}_{n} \mathbf{H}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{w} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{v}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\mathbf{v}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{w} $\mathbf{W} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{F} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix w}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{a} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{W} = \mathbf{W} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{W} = \mathbf{W} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{W} = \mathbf{W} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W} + \mathbf{W} = \mathbf$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{Y} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{I}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{w}}$ \mathbf{W} \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ \mathbf{H} $\mathbf{P} \text{ is the error correlation matrix w}$ \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{E} = \left\{ \mathbf{W}^{T} \right\}$ $\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ \mathbf{H} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $\mathbf{E} \text{ filter.}$ \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $\mathbf{E} \text{ filter.}$ \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $\mathbf{E} \text{ filter.}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ \mathbf{H} \mathbf{P} \mathbf{W} $\mathbf{P}^{H} = \mathbf{K}_{\eta} \mathbf{P}^{H} = \mathbf{K}_{\eta}$ $\mathbf{P}^{H} = \mathbf{W}$ \mathbf{W} $\mathbf{W} = \mathbf{W}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ \mathbf{H} $\mathbf{P} \text{ is the error correlation matrix w}$ \mathbf{W} \mathbf{W} $\mathbf{E} = \{ \mathcal{W} \}$ is the noise covariancematrix $\hat{\zeta}_{i} \text{ is the conjugate transpose}$ \mathbf{F} \mathbf{U} $$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}\mathbf{M}\mathbf{S}\mathbf{E} filter.$ $\mathbf{V}^{*} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W}\mathbf{M}\mathbf{S}\mathbf{E} filter.$ $\mathbf{V}^{*} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix } \mathbf{W}\mathbf{M}\mathbf{S}\mathbf{E} filter.$ $\mathbf{V}^{*} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix } \mathbf{W}\mathbf{W}\mathbf{S}\mathbf{E} filter.$ $\mathbf{V}^{*} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix } \mathbf{W}\mathbf{W}\mathbf{S}\mathbf{E} filter.$ $\mathbf{V}^{*} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix } \mathbf{W}\mathbf{W}\mathbf{S}\mathbf{E} filter.$ $\mathbf{V}^{*} = \mathbf{E} \begin{bmatrix} \gamma \mathbf{V} \end{bmatrix} \text{ is the error correlation matrix } \mathbf{W}\mathbf{W}\mathbf{S}\mathbf{E} filter.$ $\mathbf{W} = \mathbf{W}\mathbf{W}\mathbf{W}\mathbf{S}\mathbf{E} filter.$ $\mathbf{W} = \mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{W}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ \mathbf{H} \mathbf{P} \mathbf{W} \mathbf{P} \mathbf{W} \mathbf{H} \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ \mathbf{W} $\mathbf{P} = \mathbf{E} \{ \mathbf{M} \}$ is the error correlation matrix $\zeta_{i} = \mathbf{E} \{ \mathbf{M} \}$ is the noise covariance matrix $(\cdot)^{u}$ is the conjugate transpose \mathbf{P} \mathbf{H} $\mathbf{P} = \mathbf{P}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ \mathbf{H} $\mathbf{P} i \text{ is the error correlation matrix w}$ \mathbf{W} \mathbf{W} \mathbf{H} $\mathbf{F} i \text{ if the moles of SNR can be used to construct the MMSE filter.$ \mathbf{W}
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{J}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{J}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{J}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}\mathbf{W}\mathbf{W}\mathbf{E} = \mathbf{W}\mathbf{P}^{H} + \mathbf{W}\mathbf{P}^{H} + \mathbf{W}^{H} = \mathbf{W}\mathbf{P}^{H} = \mathbf{W}\mathbf{P}^{$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ \mathbf{H} $\mathbf{P} i \text{ filter.}$ $\mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H}$ $\mathbf{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H}$ $\mathbf{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{\gamma}$ $\mathbf{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} \mathbf{P} \mathbf{H}_{\gamma}$ $\mathbf{H} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} \mathbf{P} P$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ \mathbf{H} $\mathbf{P} i \text{ filter.}$ \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} \text{ filter.}$ \mathbf{M} \mathbf{M} \mathbf{M} $\mathbf{E} \text{ filter.}$ \mathbf{M} \mathbf{M} $\mathbf{E} \text{ filter.}$ \mathbf{W} $\mathbf{P} \text{ is the error correlation matrix w}$ \mathbf{V} \mathbf{U} U	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} \mathbf{P} $$
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{n} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} $$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}PRE = \mathbf{W}PRE = \mathbf$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}	$\dot{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\dot{\gamma} = \mathbf{W}$ \mathbf{W}
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix w}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} \text{ is the conjugate transpose}$ $\mathbf{U}_{i} \text{ is the conjugate transpose}$ $\mathbf{U}_{i} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{PII} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{PII} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{PII} = \mathbf{W}_{PII} \mathbf{E} \left[\mathbf{P} \mathbf{W}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{PII} = \mathbf{W}_{PII} \mathbf{E} \left[\mathbf{P} \mathbf{W}_{\gamma} \mathbf{P}^{H} + \mathbf{W}_{n} \right]^{-1}$ $\mathbf{W}_{PII} = \mathbf{W}_{PII} \mathbf{E} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{P}^{H} + \mathbf{W}_{n} \right\}$ $\mathbf{W}_{PII} = \mathbf{W}_{\gamma} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \right\}$ $\mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \mathbf{E} \left\{ \mathbf{W}_{\gamma} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{PH} = \mathbf{W} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH}$ $\mathbf{W}_{PH} = \mathbf{W}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH}$ $\mathbf{W}_{PH} = \mathbf{W}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH}$ $\mathbf{W}_{PH} = \mathbf{W}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH} \mathbf{E}_{PH}$ $\mathbf{W}_{PH} = \mathbf{W}_{PH} \mathbf{E}_{PH} $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{n} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}MSE = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W}PRE = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W}PRE = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W}PRE = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W}PRE = \mathbf{K}_{Y} \mathbf{P}^{H} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} $\mathbf{F} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $\mathbf{F} = \mathbf{E} \begin{bmatrix} \mathbf{W} \end{bmatrix}$ $\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ \mathbf{W} \mathbf	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M} \mathbf
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}MSE = \mathbf{K}_{i}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}MSE filter.$ $\mathbf{W}Pi + \mathbf{K}_{i} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}Pi + \mathbf{W}Pi + W$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{W} $\mathbf{W}MMSE = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MMSE = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{p}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{K}_{\gamma} \mathbf{p}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{I} I$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \mathbf{J}^{-1}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{F}_{i} \mathbf{J}^{-1}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{E}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{E}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{E}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{H} \mathbf{W} \mathbf{E} \mathbf{E} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \mathbf{R}_{i} \right]^{-1}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{E}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{R}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{R}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{R}_{i} \mathbf{R}_{i}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{i} \mathbf{R}_{i} \mathbf{R}_{i$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}MSE = \mathbf{K}\gamma \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}MSE filter.$ $\mathbf{W}MSE = \mathbf{K}\gamma \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W}PRSE filter.$ $\mathbf{W}MSE filter.$ $\mathbf{W}PRSE filter.$ $\mathbf{W}PRSE$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{W} $\mathbf{MMSE} = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{F}	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{H} \mathbf{E}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} \mathbf{filter}.$ $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} \mathbf{filter}.$ $\mathbf{W} \mathbf{MSE} \mathbf{filter}.$ $\mathbf{W} \mathbf{MSE} \mathbf{filter}.$ $\mathbf{W} \mathbf{WSE} \mathbf{W} \mathbf{WSE} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} W$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{SE} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{v}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W} \text{ priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{V}_{\mathbf{v}} = \mathbf{E} \{ \gamma \mathbf{V} \} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} \text{ is the noise covariance matrix } \mathbf{W} \text{ between noise and clutter.}$ $(.)^{u} \text{ is the conjugate transpose}$ $\mathbf{H} \text{ uge computational load involved due to inverse}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{V}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W}_{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the onise covariance matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the onise covariance matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the onise covariance matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the onise covariance matrix } \mathbf{W}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{W} \mathbf{W} = \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the onise covariance matrix } \mathbf{W} \text{ is the onise covariance matrix } \mathbf{W} \text{ is the onise covariance matrix } \mathbf{W} \text{ is the conjugate transpose} \mathbf{W} \text{ is the onion of involved due to inverse}$ $\hat{\boldsymbol{\zeta}}_{i} = \mathbf{W} = \mathbf{W} \mathbf{W} = \mathbf{W} = \mathbf{W} \mathbf{W} = $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{h}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \left[\mathbf{I} \mathbf{E} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{h}$ $\mathbf{W} \mathbf{H} \mathbf{M} \mathbf{N} \mathbf{S} \mathbf{E} \left[\mathbf{I} \mathbf{E} \mathbf{E} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} H$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{W} \mathbf{WSE} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} W$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W} \mathbf{W} \mathbf{M}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \mathbf{E} \mathbf{P}^{H} \mathbf{E} \mathbf{P}^{H} \mathbf{E} \mathbf{P}^{H} \mathbf{I}$ $\mathbf{W} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \mathbf{E} \mathbf{E} \mathbf{E}^{H} \mathbf{P}^{H} \mathbf{E} \mathbf{E}^{H} \mathbf{E} \mathbf{E}^{H} \mathbf{E} \mathbf{E}^{H} \mathbf{E} \mathbf{E}^{H} \mathbf{E}^{H} \mathbf{E} \mathbf{E}^{H} \mathbf{E}^{H$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} + \mathbf{K}_{H} \mathbf{J}^{-1} \mathbf{r}$ $\mathbf{W} \mathbf{H} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r}$ $\mathbf{W} \mathbf{H} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r}$ $\mathbf{W} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} r$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{v} \text{ priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{V} \text{ are error correlation matrix w}$ $\mathbf{V} \text{ are error correlation matrix w}$ $\mathbf{V} \text{ is the noise covariance matrix}$ $\hat{\mathbf{V}} = \mathbf{E} \{ \mathbf{Y}' \} \text{ is the conjugate transpose}$ $\hat{\mathbf{V}} \text{ is the conjugate transpose}$ $\hat{\mathbf{U}} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{r}$ $\mathbf{v}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix w}$ $\mathbf{v}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{v}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} \mathbf	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{P} = \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{P} = \mathbf{P} = \mathbf{P}$ $\mathbf{P} = \mathbf{P} = \mathbf{P} = \mathbf{P}$ $\mathbf{P} = \mathbf{P} = \mathbf{P} = \mathbf{P}$ $\mathbf{P} = \mathbf{P} = P$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{in} \mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{MSE} = \mathbf{K}_{i} \mathbf{P}^{H} \mathbf{W}_{in}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{W}_{in} \mathbf{W}_{in}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{W}_{in} \mathbf{W}_{in}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{W}_{in} \mathbf{W}_{in} \mathbf{W}_{in}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{W}_{in} \mathbf{W}_{$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix w}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} \mathbf{R}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W} \mathbf{R}$ $\mathbf{W} = \mathbf{W} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{w}_{i}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{h}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{h}_{i} \mathbf{h}_{i}$ $\mathbf{W}_{i} = \mathbf{H}_{i} \mathbf{h}_{i}$ $\mathbf{W}_{i} = \mathbf{H}_{i} \mathbf{h}_{i}$ $\mathbf{H}_{i} = \mathbf{H}_{i} = \mathbf{H}_{i$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{Piori} \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{W}_{i} = \mathbf{F} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix w}$ $\mathbf{W}_{i} = \mathbf{F} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\mathbf{W}_{i} = \mathbf{F} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{U}}_{i} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \left\{ \mathbf{W}_{i} \text{ is the conjugate transpose} \mathbf{W}_{i} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \left\{ \mathbf{W}_{i} \text{ is the conjugate transpose} \mathbf{W}_{i} \text{ is the conjugate transpose} \mathbf{W}_{i} \text{ is the conjugate transpose} \mathbf{W}_{i} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{W} = \mathbf{R}$ $\mathbf{W} = \mathbf{R}$ $\mathbf{W} = \mathbf{R}$ \mathbf{R} $\mathbf{W} = \mathbf{R}$ \mathbf{R} $\mathbf{W} = \mathbf{R}$ \mathbf{R}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ $\mathbf{W} = \mathbf{r}$ \mathbf{r} $\mathbf{W} = \mathbf{r}$ \mathbf{r} $\mathbf{W} = \mathbf{r}$ \mathbf{r} $\mathbf{W} = \mathbf{r}$ \mathbf{r} $\mathbf{R} = \mathbf{r}$ \mathbf{r} $\mathbf{R} = \mathbf{r}$ $\mathbf{R} = \mathbf$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{H} = \mathbf{v}$ $\mathbf{v}_{H} = $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{F} \mathbf{H} \mathbf{F}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{N} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{y}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{N} \mathbf{N} \mathbf{E} \mathbf{f} = \mathbf{K} \mathbf{V} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{y}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \right]^{-1} \mathbf{I}$ $\mathbf{W} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} r$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{W} = W$
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W} $$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} \mathbf{w} $$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{v} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{v} = \mathbf{W} \mathbf{r}$ $\mathbf{v} = \mathbf{r}$ $\mathbf{r} = \mathbf{r}$ \mathbf	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{\mu} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K} \mathbf{v} \mathbf{P}^{\mu} \left[\mathbf{P} \mathbf{K}_{\mu} \mathbf{P}^{\mu} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{V}_{MMSE} = \mathbf{K} \mathbf{v}_{\mu} \mathbf{P}^{\mu} \left[\mathbf{P} \mathbf{K}_{\mu} \mathbf{P}^{\mu} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{V}_{i} = \mathbf{F} \left\{ \gamma \mathbf{v} \right\} \text{ is the error correlation matrix w}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{v} \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{v} \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{v} \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{v} \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{v} \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \mathbf{v} \right\} \text{ is the conjugate transpose}$
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W}	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ \mathbf{W} $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{J}^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{J}^{-1}$ $\mathbf{W} = \mathbf{W} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{t} \mathbf{c}.$ $\mathbf{W} = \mathbf{F} \mathbf{F} \mathbf{M} \mathbf{NSE} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{t} \mathbf{c}.$ $\mathbf{W} = \mathbf{F} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{E}.$ $\mathbf{W} = \mathbf{F} \mathbf{V} \mathbf{P}^{H} \mathbf{F} \mathbf{M} \mathbf{NSE} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{t} \mathbf{c}.$ $\mathbf{W} = \mathbf{F} \mathbf{F} \mathbf{V} \mathbf{P}^{H} \mathbf{F} \mathbf{M} \mathbf{NSE} \mathbf{F} \mathbf{H} \mathbf{E}.$ $\mathbf{W} = \mathbf{F} \mathbf{V} \mathbf{P} \mathbf{H} \mathbf{F} \mathbf{M} \mathbf{NSE} \mathbf{F} \mathbf{H} \mathbf{E}.$ $\mathbf{W} = \mathbf{F} \mathbf{V} \mathbf{V} \mathbf{P} \mathbf{H} \mathbf{F} \mathbf{M} \mathbf{NSE} \mathbf{F} \mathbf{H} \mathbf{E}.$ $\mathbf{W} = \mathbf{F} \mathbf{W} \mathbf{V} \mathbf{E} \mathbf{H} \mathbf{E} \mathbf{E}.$ $\mathbf{W} = \mathbf{W} \mathbf{W} \mathbf{SE} \mathbf{E} \mathbf{H} \mathbf{E}.$ $\mathbf{W} = \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{H} \mathbf{E}.$ $\mathbf{W} = \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ \mathbf{v}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{v}_{eight} \text{ rector is a compromise between noise and clutter.}$ $\mathbf{v}_{i} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{v}_{eight} \text{ vector is a compromise between noise and clutter.}$ $\mathbf{v}_{i} \text{ is the noise covariance matrix}$ $\mathbf{v}_{i} \text{ is the conjugate transpose}$ $\mathbf{v}_{i} \text{ is the conjugate transpose}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{v} \mathbf{h} \mathbf{r} r	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{W} = \mathbf{W} \mathbf{R} \mathbf{E} \text{ filter.}$ $\mathbf{V} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{V} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{W} = \mathbf{E} \left\{ \gamma \mathbf{V} \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{W} = \mathbf{W} = \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} + \mathbf{W} = \mathbf{W} + \mathbf{W} +$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{V}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{V}_{i} = \mathbf{F} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix w}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the correlation matrix}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{V}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{F} \mathbf{W} \mathbf{F}
$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{H}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{H}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{H}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{H}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{H}$ $\mathbf{W}_{MSE} \text{ filter.}$ $\mathbf{W}_{result} = \mathbf{W}_{result} \mathbf{P}_{result} = \mathbf{W}_{result} = \mathbf{W}_{result} \mathbf{P}_{result} = \mathbf{W}_{result} \mathbf{P}_{result} = \mathbf{W}_{result} = \mathbf{W}_{result} = \mathbf{W}_{result} \mathbf{P}_{result} = \mathbf{W}_{result} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{W}}$ $\hat{\mathbf{M}}$ \mathbf{M} $\mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{I}$ \mathbf{W} W	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} \mathbf{W} \mathbf{W} \mathbf{M} \mathbf{M} $\mathbf{F} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{r}$ \mathbf{F} \mathbf{P} \mathbf{W} \mathbf{F}	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} \mathbf{MSE} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{v}} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W} \mathbf{MSE} \text{ filter.}$ $\mathbf{v} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix } \mathbf{w}$ $\mathbf{v} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \mathbf{W}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \mathbf{W}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{E} \{ \mathbf{W}^{T} \} \text{ is the error correlation matrix} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\boldsymbol{v}}_{i} = \mathbf{W} \mathbf{W} \mathbf{E} \mathbf{E} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\mathbf{W} = \mathbf{W} \mathbf{W} \mathbf{E} \text{ filter.}$ $\hat{\mathbf{W} = \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W}$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\mathbf{W}MSE = \mathbf{K}\gamma \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}\gamma \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ \mathbf{W} \mathbf{W} $\mathbf{W}MSE = \mathbf{K}\gamma \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ \mathbf{W} $$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\hat{\mathbf{w}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ \mathbf{v} \mathbf{v} \mathbf{w}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1} \mathbf{I}$ \mathbf{W} \mathbf
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{v} \mathbf{r}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{PIOT} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{PIOT} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{PIOT} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{PIOT} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{PIOT} = \mathbf{W}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{PIOT} = \mathbf{W}_{\gamma} \mathbf{P}_{\gamma} \mathbf{P}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W}_{\gamma} \mathbf{P}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \end{bmatrix} \text{ is the error correlation matrix w} \\\mathbf{W}_{\gamma} = \mathbf{E} \begin{bmatrix} \mathbf{W}_{\gamma} \end{bmatrix} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\mathbf{W}MSE = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\frac{1}{2}A priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{v}_{i} = \mathbf{E}\{\gamma'\} \text{ is the error correlation matrix }$ $\hat{\mathbf{v}}_{i} = \mathbf{E}\{\gamma'\} \text{ is the correlation matrix }$ $\hat{\mathbf{v}}_{i} = \mathbf{E}\{\gamma'\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{v}_{i} = \mathbf{F}_{i} \mathbf{V}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{v}_{i} = \mathbf{F}_{i} \mathbf{V}^{H} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{F}_{i} \mathbf{V}^{H} = \mathbf{V}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{F}_{i} \mathbf{V}^{H} = \mathbf{V}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{F}_{i} \mathbf{V}^{H} = \mathbf{r}$ $\mathbf{v}_{i} = \mathbf{r}$ \mathbf{v}_{i
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{W}MSE \text{ filter.}$ $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{W} = \mathbf{W}\mathbf{R}^{-1} \mathbf{E} \mathbf{H} \mathbf{R}^{-1} \mathbf{E} \mathbf{R}^{-1} \mathbf{E} \mathbf{R}^{-1} \mathbf{R}^$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{V}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{P}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\mathbf{C}_{i}^{*} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $(.)^{u}$ is the conjugate transpose $(.)^{u}$ is the conjugate transpose $(.)^{u}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{v} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{F} \mathbf{W} \mathbf{F} \mathbf{F} \mathbf{W} \mathbf{F}	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{V}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{W}_{MSE} \text{ filter.}$ $\mathbf{V}_{i} = \mathbf{E}\{\gamma'\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{E}\{\gamma'\} \text{ is the onise covariance matrix } \mathbf{W}_{i} = $
$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the error correlation matrix } \mathbf{W}_{i}$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the conjugate transpose (ulter interference (clutter + noise) (\mathbf{W}_{i} + \mathbf{W}_{i})$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the conjugate transpose (\mathbf{W}_{i} = \mathbf{W}_{i})$ $\hat{\gamma}_{i} = \mathbf{E} \left\{ \gamma_{i}^{i} \right\} \text{ is the conjugate transpose (\mathbf{W}_{i} = \mathbf{W}_{i})$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{i} \mathbf{P}_{H} \left[\mathbf{P}_{i} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ \mathbf{W}_{i} $\mathbf{W}_{i} = \mathbf{F}_{i} \left[\mathbf{P}_{i} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{K}_{i} \mathbf{P}_{i} \left[\mathbf{P}_{i} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E}_{i} = \mathbf{W}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{E}_{i} \mathbf{W}_{j} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{E}_{i} \mathbf{W}_{j} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{E}_{i} \mathbf{W}_{j} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i} \mathbf{E}_{i}$ $\mathbf{W}_{i} = \mathbf{E}_{i} \mathbf{W}_{j} \mathbf{E}_{i} \mathbf{E}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{W} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ \mathbf{W} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{F} \mathbf{P} \mathbf{F} \mathbf{V} \mathbf{P} \mathbf{H} + \mathbf{K}_{\mathbf{n}} \end{bmatrix}^{-1}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{W} \mathbf{W} \mathbf{S} \mathbf{E} \mathbf{H} \mathbf{E} \mathbf{U}$ $\mathbf{W} \mathbf{W} \mathbf{S} \mathbf{E} \mathbf{H} \mathbf{U}$ $\mathbf{W} \mathbf{S} \mathbf{E} \mathbf{U} \mathbf{U}$ $\mathbf{W} \mathbf{U} \mathbf{U} \mathbf{U} \mathbf{U} \mathbf{U} \mathbf{U} \mathbf{U} U$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{r}$ $\mathbf{W}_{i} = \mathbf{F}_{i} \mathbf{F}_{i} = \mathbf{F}_{i} \mathbf{F}_{i}$ $\mathbf{W}_{i} = \mathbf{F}_{i} = \mathbf{F}_{i} \mathbf{F}_{i}$ $\mathbf{W}_{i} = \mathbf{F}_{i} = \mathbf{F}_{i} = \mathbf{F}_{i} \mathbf{F}_{i}$ $\mathbf{W}_{i} = \mathbf{F}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{E} \text{ filter.}$ $\mathbf{W}_{i} = \mathbf{E} \left\{ \gamma \right\} \text{ is the error correlation matrix w}$ $\mathbf{W}_{i} = \mathbf{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \text{ is the conjugate transpose}$	$\hat{\gamma}_{,i} = \mathbf{w}_{,i}^{,\mu} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{W} $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{\mu} \begin{bmatrix} \mathbf{P} \mathbf{K}_{,\mu} \mathbf{P}^{\mu} + \mathbf{K}_{,\mu} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{V} \mathbf{P}^{\mu} \begin{bmatrix} \mathbf{P} \mathbf{K}_{,\mu} \mathbf{P}^{\mu} + \mathbf{K}_{,\mu} \end{bmatrix}^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{W} \mathbf{R} \mathbf{E} \mathbf{f} \mathbf{H} \mathbf{r}.$ $\mathbf{W} = \mathbf{E} \{ \mathbf{W} \} \mathbf{r} \mathbf{R} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} r$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{w} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} $\mathbf{F} = \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{H}} \right]^{-1}$ \mathbf{W}	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\mathbf{\hat{\gamma}} = \mathbf{W}$ \mathbf{W}	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ \mathbf{v} $\mathbf{W} = \mathbf{W} \mathbf{r}$ $\mathbf{W} = \mathbf{F} \mathbf{r}$ $\mathbf{W} = \mathbf{r}$
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}SE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} = \mathbf{W}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} = \mathbf{W}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} = \mathbf{W}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} = \mathbf{W}$ \mathbf{W} $\mathbf{W}SE = \mathbf{F}_{\gamma} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} = \mathbf{W}$ \mathbf{W} $\mathbf{W} = \mathbf{W}$ $\mathbf{W} = W$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{v}} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{W} \mathbf{F}	$\hat{\gamma}_{i} = \mathbf{w}_{j}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{v} \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{v} \mathbf{W}
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{K}_{\gamma} \mathbf{P}^{H} \mathbf{E} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{W} $\mathbf{W}MSE = \mathbf{W}^{T} \mathbf{P}^{H} \mathbf{E} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} \mathbf{P}^{H} + \mathbf{K}_{H} \mathbf{P}^{H} \mathbf{P}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ \mathbf{v} \mathbf{w}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ \mathbf{W}
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{w} $\hat{\mathbf{r}} = \mathbf{W}\mathbf{r}$ \mathbf{w} $\hat{\mathbf{r}} = \mathbf{W}\mathbf{r}$ \mathbf{w} $$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} $	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{\text{H}} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}} \mathbf{r}$ $\mathbf{W}_{\text{MMSE}} = \mathbf{K}_{i} \mathbf{P}^{\text{H}} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{\text{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\text{H}} = \mathbf{W}_{\text{H}} \mathbf{E}$ $\mathbf{W}_{\text{H}} = \mathbf{W}_{i}^{\text{H}} \mathbf{E} \mathbf{R}_{i}^{\text{H}} \mathbf{R}_{i}^{\text{H}} \mathbf{R}_{i}^{\text{H}}$ $\mathbf{W}_{\text{MSE}} = \mathbf{K}_{i}^{\text{H}} \mathbf{P}^{\text{H}} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{\text{H}} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W}_{\text{H}} = \mathbf{W}_{\text{H}} \mathbf{E} \text{ filter.}$ $\mathbf{W}_{\text{H}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $(j)^{\text{H}} \text{ is the noise covariance matrix}$ $(j)^{\text{H}} \text{ is the conjugate transpose}$ $\mathbf{W}_{\text{H}} = \mathbf{W}_{\text{H}} = \mathbf{W}_{\text{H}} \mathbf{E} \text{ interference} (\text{clutter +noise}).$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v}
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\hat{\boldsymbol{\gamma}} = \mathrm{E} \left\{ \gamma \right\} \text{ is the error correlation matrix w}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathrm{E} \left\{ \gamma \right\} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathrm{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathrm{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} \text{ is the conjugate transpose}$ $\mathbf{W}_{i} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{\mu} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K} \mathbf{P}^{\mu} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mu} + \mathbf{K}_{\boldsymbol{\mu}} \right]^{-1}$ $\frac{1}{2} \mathbf{F} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mu} + \mathbf{K}_{\boldsymbol{\mu}} \right]^{-1}$ $\frac{1}{2} \mathbf{F} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mu} + \mathbf{K}_{\boldsymbol{\mu}} \right]^{-1}$ $\frac{1}{2} \mathbf{F} \left[\mathbf{P} \mathbf{K}_{\boldsymbol{\gamma}} \mathbf{P}^{\mu} + \mathbf{K}_{\boldsymbol{\mu}} \right]^{-1}$ $\frac{1}{2} \mathbf{F} \left\{ \mathbf{M} \mathbf{N} \mathbf{SE} \right\} \text{ filter.}$ $\frac{1}{2} \mathbf{F} \left\{ \mathbf{M}^{\mu} \mathbf{SE} \right\} \text{ is the error correlation matrix}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \right\} \text{ is the conjugate transpose}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \mathbf{SE} \right\} \text{ is the conjugate transpose}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \mathbf{E} \right\} \text{ is the conjugate transpose}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \mathbf{E} \right\} \text{ is the conjugate transpose}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \mathbf{E} \right\} \text{ is the conjugate transpose}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \mathbf{E} \right\} \text{ is the conjugate transpose}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{M}^{\mu} \mathbf{E} \right\} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\frac{1}{2} \mathbf{P} \mathbf{i} \mathbf{P} \mathbf{W}_{i}$ $\frac{1}{2} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \int_{i}^{-1} \mathbf{H}_{i} \mathbf{P}^{H} \mathbf{H}_{i}$ $\frac{1}{2} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \int_{i}^{-1} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \int_{i}^{-1} \mathbf{H}_{i} \mathbf{P} \mathbf{W}^{H} \mathbf{E} \text{ filter.}$ $\frac{1}{2} = \mathbf{E} \left\{ \gamma \gamma \right\} is the error correlation matrix is the noise covariance matrix is the noise of the noise covariance matrix is the noise$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{P}_{i} \mathbf{H}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{H}_{i} \mathbf{H}_{i} \mathbf{H}_{i}$
$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{*}{=} E\{ \boldsymbol{\gamma}^{H} \}$ is the noise covariance matrix $\stackrel{*}{_{i}} = E\{ \boldsymbol{\gamma}^{H} \}$ is the noise covariance matrix $\stackrel{*}{_{i}} = E\{ \boldsymbol{\gamma}^{H} \}$ is the conjugate transpose $\stackrel{*}{_{i}} = \mathbf{W}_{i} = \mathbf{W}_{i} = \mathbf{W}_{i} $ $\stackrel{*}{=} \mathbf{W}_{i} = \mathbf$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{W}_{i} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{1}{\rightarrow} = \mathbb{E} \left\{ \gamma \right\} \text{ is the error correlation matrix } $ $\stackrel{1}{\rightarrow} = \mathbb{E} \left\{ \gamma \right\} \text{ is the error correlation matrix } $ $\stackrel{1}{\rightarrow} = \mathbb{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\stackrel{1}{\rightarrow} \text{ is the conjugate transpose}$ $\stackrel{1}{\rightarrow} \text{ Huge computational load involved due to inverse}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{\mu} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}$ $\hat{\boldsymbol{\gamma}} = \mathbf{F} \left\{ \gamma \hat{\boldsymbol{\gamma}} \right\}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \left\{ \gamma \hat{\boldsymbol{\gamma}} \right\}$ $\hat{\boldsymbol{\gamma}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{K}_{j} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{K}_{j} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{K}_{j} \mathbf{P}^{H} \mathbf{F} \mathbf{R}_{i} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{r}$ $\frac{1}{i} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} \mathbf{F} F$
$\begin{split} \hat{\gamma}_{i} &= \mathbf{w}_{i}^{\mu} \mathbf{r} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W} \\ \mathbf{MMSE} \\ &= \mathbf{K} \\ \mathbf{\gamma} \\ \mathbf{P} \\ \mathbf{H} \\ \mathbf{MMSE} \\ &= \mathbf{K} \\ \mathbf{P} \\ $	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \begin{bmatrix} \mathbf{F} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1} \mathbf{I}$ $\stackrel{\text{estimator matrix w}}{\text{estimator matrix w}}$ $\stackrel{\text{estimator matrix w}}{\text{estimator matrix w}}}$ $\stackrel{\text{estimator matrix w}}{\text{estimator matrix w}}}$ $\stackrel{\text{estimator matrix w}}{\text{estimator matrix w}}}$ $\stackrel{\text{estimator matrix w}}{\text{esult is minimum estimation error}}$ $\stackrel{\text{estimator matrix w}}{\text{esult is minimum estimation error}}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{H} = \mathbf{F}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{H} = \mathbf{W} \mathbf{N} \mathbf{E} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{H} \mathbf{P} \mathbf{H} \mathbf{R} \mathbf{H} H$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{Y}\mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{Y}\mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\overset{1}{}_{r} = \mathbf{E}\left\{ \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{2}{}_{r} = \mathbf{E}\left\{ \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{2}{}_{r} = \mathbf{E}\left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\overset{3}{}_{r} = \mathbf{E}\left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\overset{3}{}_{r} = \mathbf{E}\left\{ \gamma \right\} \text{ is the conjugate transpose}$
$\hat{\boldsymbol{\chi}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\chi}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\chi}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\chi}} = \mathbf{W}_{i}^{H} \mathbf{h}_{i}$ $\hat{\boldsymbol{\chi}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{\text{estimator matrix w}}{\text{estimates of SNR can be used to construct the MMSE filter.}$ $\stackrel{\text{estimator matrix w}}{\stackrel{\text{estimator matrix w}}{\text{in the noise covariance matrix}}$ $\stackrel{\text{estimator matrix w}}{\stackrel{\text{estimator matrix w}}{\text{is the noise covariance matrix}}$ $\stackrel{\text{estimator matrix w}}{\stackrel{\text{estimator matrix w}}{\text{is the noise covariance matrix}}$ $\stackrel{\text{estimator matrix}}{\stackrel{\text{old the recorrelation matrix}}{\text{is the noise covariance matrix}}$ $\stackrel{\text{estudt is minimum estimation error.}}{\stackrel{\text{estudt to involved due to inverse}}{\text{estudt is minimum estimation arror.}}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\boldsymbol{\gamma}_{i}\} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\boldsymbol{\gamma}_{i}\} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\boldsymbol{\gamma}_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\mathbf{M}_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\mathbf{M}_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\mathbf{M}_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i} \{\mathbf{M}_{i}\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{1}{} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \int_{-1}^{-1} \mathbf{r}$ $\stackrel{1}{} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \int_{-1}^{-1} \mathbf{P} \mathbf{R}^{H} \mathbf{P}^{H} \mathbf{R}^{H} \mathbf{R}^{H}$ $\stackrel{1}{} \mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \int_{-1}^{-1} \mathbf{P} \mathbf{R}^{H} \mathbf{R}^$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}\mathbf{r}$ $\mathbf{P}^{H} + \mathbf{K}_{H} \int_{0}^{1} \mathbf{r}$ $\mathbf{P}^{H} = \mathbf{F} \mathbf{r}$ $\mathbf{P}^{H} = \mathbf{P}^{H} = \mathbf{r}$ $\mathbf{P}^{H} = \mathbf{P}^{H} = $
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}$ $\hat{\boldsymbol{\gamma}} p^{H} + \mathbf{K}_{H}$ $\hat{\boldsymbol{\gamma}}^{T} = \mathbf{K} \mathbf{v} p^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K} \mathbf{v} p^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K} \mathbf{v} p^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K} \mathbf{v} p^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K} \mathbf{v} p^{H} (\mathbf{P} \mathbf{H} + \mathbf{K}_{H})$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \mathcal{M} \} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \mathcal{M} \} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\nu}} = \mathbf{E} \{ \mathbf{W} \} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\chi}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\chi}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\chi}} = \mathbf{W}$ $\hat{\boldsymbol{\chi}} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K} \mathbf{r}$ $\mathbf{MMSE} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{R}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{MMSE} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{R}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{MMSE} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{R}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{MMSE} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{R}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{MMSE} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K} \mathbf{r} \mathbf{R}^{H} + \mathbf{K}_{H} \right]^{-1} \mathbf{I}$ $\mathbf{MMSE} = \mathbf{K} \mathbf{r} \mathbf{P}^{H} \mathbf{R} \mathbf{R}^{H} R$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\frac{1}{2} \mathbf{h} priori \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \boldsymbol{\gamma}^{T} \} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \mathbf{M}^{T} \} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{ \mathbf{M}^{T} \} \text{ is the conjugate transpose}$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{\text{H}} \mathbf{\Gamma}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}} \mathbf{\Gamma}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}} \mathbf{\Gamma}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}}$ $\stackrel{1}{\rightarrow} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}}$ $\stackrel{1}{\rightarrow} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{\text{H}}$ $\stackrel{1}{\rightarrow} \mathbf{H}_{i}^{\text{H}} \mathbf{H}_{i}^{H$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{h}_{i}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{\mathbf{M}}{=} \mathbf{H}_{i} \mathbf{M} \mathbf{N} \mathbf{E} \text{ filter.}$ $\stackrel{\mathbf{M}}{=} \mathbf{H}_{i} \mathbf{P}_{i} \mathbf{H}_{i}$ $\stackrel{\mathbf{M}}{=} \mathbf{E} \left\{ \gamma \right\} \text{ is the error correlation matrix }$ $\stackrel{\mathbf{W}}{=} \mathbf{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\stackrel{\mathbf{M}}{=} \mathbf{H}_{i} \text{ uptional extinction and interference (clutter + noise).}$ $\stackrel{\mathbf{M}}{=} \mathbf{H}_{i} \text{ uptional extinuation error.}$ $\stackrel{\mathbf{M}}{=} \mathbf{H}_{i} \text{ uptional extinuation error.}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{h}\mathbf{r}$ \mathbf{h}	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{K}_{i}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P}\mathbf{K}_{i}\mathbf{P}^{H} + \mathbf{K}_{i} \end{bmatrix}^{-1}$ $\mathbf{v}_{i} = \mathbf{F}_{i}\left[\mathbf{P}\mathbf{K}_{i}\mathbf{P}^{H} + \mathbf{K}_{i}\right]^{-1}$ $\mathbf{v}_{i} = \mathbf{E}_{i}\left[\mathbf{P}\mathbf{K}_{i}\mathbf{P}^{H} + \mathbf{K}_{i}\right]^{-1}$ $\mathbf{w}_{i} = \mathbf{E}_{i}\left[\mathbf{V}_{i}\right]$ $\mathbf{v}_{i} = \mathbf{E}_{i}\left[\mathbf{V}_{i}\left[\mathbf{V}_{i}\right]$ $\mathbf{v}_{i} = \mathbf{E}_{i}\left[\mathbf{V}_{i}\left[\mathbf{V}_{i$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{E} \{ \gamma' \}$ is the error correlation matrix $\hat{\gamma}_{i} = \mathbf{E} \{ \gamma' \}$ is the onise covariance matrix $\hat{\gamma}_{i} = \mathbf{E} \{ \gamma' \}$ is the conjugate transpose $\hat{()}^{"}$ is the conjugate transpose $\hat{()}^{"}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{n} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}r$ \mathbf{w} $$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\mathbf{MMSE} = \mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ \mathbf{v} $\mathbf{P}_{H} = \mathbf{P}_{H} \mathbf{r}$ \mathbf{v} $\mathbf{P}_{H} = \mathbf{F}_{H} \mathbf{r}$ $\mathbf{P}_{H} = \mathbf{P}_{H} \mathbf{r}$ $\mathbf{P}_{H} = \mathbf{P}_{H} = \mathbf{P}_{$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\hat{\boldsymbol{\gamma}} = \mathbf{F}\mathbf{r}$ $\mathbf{v}_{i} = \mathbf{r}$ $\mathbf{v}_$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K} \mathbf{v} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\frac{1}{2} P \mathbf{I} \mathbf{r} \mathbf{V} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\frac{1}{2} P \mathbf{I} \mathbf{F} \mathbf{V} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix} = \mathbf{V} \mathbf{V} \mathbf{P} \mathbf{U} \mathbf{r}$ $\frac{1}{2} P \mathbf{I} \mathbf{F} \mathbf{V} \mathbf{P}^{H} \mathbf{H} \mathbf{R} \mathbf{N} \mathbf{E} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{r}$ $\frac{1}{2} P \mathbf{I} \mathbf{F} \mathbf{V} \mathbf{P}^{H} \mathbf{H} \mathbf{R} \mathbf{N} \mathbf{E} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{r}$ $\frac{1}{2} P \mathbf{I} \mathbf{F} \mathbf{V} \mathbf{P}^{H} \mathbf{H} \mathbf{R} \mathbf{N} \mathbf{E} \mathbf{F} \mathbf{I} \mathbf{I} \mathbf{E} \mathbf{r}$ $\frac{1}{2} P \mathbf{I} \mathbf{I} \mathbf{F} \mathbf{R} \mathbf{P} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{I} \mathbf{I} \mathbf{I} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} R$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\overset{1}{}_{\gamma} = \mathbf{E} \left\{ \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\overset{2}{}_{\gamma} = \mathbf{E} \left\{ \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\overset{2}{}_{\gamma} = \mathbf{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\overset{3}{}_{\gamma} = \mathbf{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$ $\overset{3}{}_{\gamma} = \mathbf{E} \left\{ \gamma \right\} \text{ is the conjugate transpose}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{v} = \mathbf{K}\mathbf{r}$ $\mathbf{v} = \mathbf{K}\mathbf{r} \mathbf{p}^{H} [\mathbf{P}\mathbf{K}_{\mathbf{v}}\mathbf{P}^{H} + \mathbf{K}_{H}]^{-1}$ $\mathbf{v} = \mathbf{F}[\mathbf{r}]^{-1} \mathbf{r}$ $\mathbf{v} = \mathbf{F}[\mathbf{r}]^{-1} \mathbf{r}$ $\mathbf{v} = \mathbf{F}[\mathbf{r}]^{-1} \mathbf{r}$ $\mathbf{v} = \mathbf{F}[\mathbf{r}]^{-1} \mathbf{r}$ $\mathbf{v} = \mathbf{r}$ $\mathbf{r} = \mathbf{r} \mathbf{r}$ $\mathbf{v} = \mathbf{r} \mathbf{r}$ $\mathbf{v} = \mathbf{r} \mathbf{r}$ $\mathbf{r} = \mathbf{r} \mathbf{r}$ $\mathbf{r} = \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r}$ $\mathbf{r} = \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}\mathbf$
$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{H}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\hat{\gamma}_{i} = \mathbf{E}_{i} \{\gamma_{i}\}$ $\mathbf{P}_{i} = \mathbf{E}_{i} = \mathbf{E}_{i} \{\gamma_{i}\}$ $\mathbf{P}_{i} = \mathbf{E}_{i} = \mathbf{E}_$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\hat{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\hat{\mathbf{r}}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the noise covariance matrix $\hat{\mathbf{r}}_{i}$ is the noise covariance matrix $\hat{\mathbf{r}}_{i}$ $\hat{\mathbf{r}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i}\mathbf{P}^{H} [\mathbf{P}\mathbf{K}_{i}\mathbf{P}^{H} + \mathbf{K}_{i}]^{-1}$ $\hat{\mathbf{v}} = \mathbf{E}\{\boldsymbol{\gamma}^{H}\}$ is the error correlation matrix $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E}\{\boldsymbol{\gamma}^{H}\}$ is the noise covariance matrix $\hat{\boldsymbol{\gamma}}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}\{\boldsymbol{\gamma}^{H}\}$ is the conjugate transpose $\hat{\boldsymbol{\gamma}}_{i}$ $\hat{\boldsymbol{\gamma}}_$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{P}^{H} + \mathbf{K}_{H} \int_{i} \mathbf{h}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\boldsymbol{\gamma}^{H}\} \text{ is the error correlation matrix w}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\boldsymbol{\gamma}^{H}\} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\boldsymbol{\gamma}^{H}\} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\boldsymbol{\gamma}^{H}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\mathbf{W}^{H}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\mathbf{W}^{H}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \{\mathbf{W}^{H}\} \text{ is the conjugate transpose}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = \mathbf{W} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W} = \mathbf{W}$ $\hat{\mathbf{v}} = \mathbf{W} = $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{H} \mathbf{r}$ \mathbf{R}	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\mathbf{MMSE} = \mathbf{K}_{i}\mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{j}\mathbf{P}^{H} + \mathbf{K}_{in} \right]^{-1}$ \mathbf{v}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{w} \mathbf{r}
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{v}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{v}} = \mathbf{W}\mathbf{r}$ \mathbf{w} $\hat{\mathbf{v}} = \mathbf{F} \mathbf{v} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1} \mathbf{r}$ \mathbf{w} w	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{W}}_{i} = \mathbf{W}_{i}$ $\hat{\mathbf{W}}_{i} = \mathbf{W}_{i}$ $\hat{\mathbf{W}}_{i} = \mathbf{W}_{i} \mathbf{h}_{i}$ $\hat{\mathbf{W}}_{i} = \mathbf{H}_{i} \mathbf{h}_{i}$ $\hat{\mathbf{H}}_{i} = \mathbf{H}_{i} \mathbf{h}_{i}$ $\hat{\mathbf{H}}_{i$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{w} \mathbf{r}	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ \mathbf{v} $\hat{\mathbf{r}} = \mathbf{W}\mathbf{r}$ \mathbf{v} \mathbf{w} $\mathbf{r} = \mathbf{E} \{\gamma_{i}\}$ $\mathbf{F} \mathbf{R}_{i} \mathbf{P}^{H} + \mathbf{K}_{in}]^{-1}$ \mathbf{w}
$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{\ \mathbf{I}} \mathbf{r} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W}_{i}^{\ \mathbf{I}} \mathbf{r} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W}_{i} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{K}_{i} \mathbf{P}^{\text{H}} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{K}_{i} \mathbf{P}^{\text{H}} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{K}_{i} \mathbf{P}^{\text{H}} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{E}_{i} \\ \hat{\boldsymbol{\gamma}}^{\ \mathbf{J}} \\ \hat{\boldsymbol{\gamma}} \\ \boldsymbol$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\mathbf{W}_{i} = \mathbf{W}_{i} \mathbf{h}_{i}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E}_{i} \mathbf{M}_{i} \mathbf{h}_{i} \mathbf{h}_{i} \mathbf{h}_{i}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E}_{i} \mathbf{M}_{i} \mathbf{h}_{i} \mathbf$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} [\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{H}]^{-1}$ $\stackrel{1}{}_{i} = \mathbf{F}_{i} \mathbf{P}_{i} \mathbf{F}_{i} \mathbf{P}_{i}$ $\stackrel{1}{}_{i} = \mathbf{E}_{i} \mathbf{M}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{P}_{i}$ $\stackrel{1}{}_{i} = \mathbf{E}_{i} \mathbf{M}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\stackrel{1}{}_{i} = \mathbf{E}_{i} \mathbf{M}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\stackrel{1}{}_{i} = \mathbf{E}_{i} \mathbf{M}_{i} \mathbf{F}_{i} F$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} P \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H}$ $\frac{1}{2} P \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} + \mathbf{K}_{H}$ $\frac{1}{2} P \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} + \mathbf{K}_$
$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\hat{\boldsymbol{\gamma}} = \mathrm{E} \left\{ \gamma \hat{\boldsymbol{\gamma}} \right\}$ is the error correlation matrix $\hat{\boldsymbol{\gamma}}_{i} = \mathrm{E} \left\{ \gamma \hat{\boldsymbol{\gamma}} \right\}$ is the noise covariance matrix $\hat{\boldsymbol{\gamma}}_{i}$ $\hat{\boldsymbol{\gamma}}_{i}$ $\hat{\boldsymbol{\gamma}}_{i}$ is the conjugate transpose $\hat{\boldsymbol{\gamma}}_{i}$ $\boldsymbol{$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{W}_{ij} \text{ priori estimates of SNR can be used to construct the matrix w estimates of SNR can be used to construct the mass is the noise error correlation matrix (i)^{u} is the conjugate transpose (i)$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} [\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{H}]^{-1}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the error correlation matrix w}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the error correlation matrix w}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{E} \{\gamma_{i}\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = $
$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{M}}_{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\text{resolution cell and involves with finding the optimal resolution resolution cell and involves with finding the optimal resolution cell and involves with finding the optimal resolution resolutic resolution res$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{K}_{i} \mathbf{P}_{i} \left[\mathbf{P}_{i} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\frac{1}{2} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\frac{1}{2} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\frac{1}{2} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\frac{1}{2} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\frac{1}{2} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\frac{1}{2} \mathbf{P}_{i} P$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{K}_{i}^{H} \mathbf{P}_{i}^{H} \left[\mathbf{P} \mathbf{K}_{i}^{H} \mathbf{P}_{i}^{H} + \mathbf{K}_{i}^{H} \right]^{-1}$ $\stackrel{\mathbf{M}}{} \text{ stimator matrix w}$ $\stackrel{\mathbf{M}}{} = \mathbf{E}_{i}^{H} \mathbf{M}_{i}^{H} \mathbf{I} \mathbf{E}_{i}^{H} \mathbf{L}_{i}^{H} \mathbf{L}_{i}^{H}$ $\stackrel{\mathbf{W}}{} = \mathbf{E}_{i}^{H} \mathbf{M}_{i}^{H} \mathbf{I} \mathbf{E}_{i}^{H} \mathbf{L}_{i}^{H} \mathbf{L}_{$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\frac{1}{2} P \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{2} P \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} = \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{2} P \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} = \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{\gamma} + \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{\gamma} + \mathbf{K}_{\gamma}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{\mathbf{M}}{=} \mathbf{E} \left\{ \gamma \mathbf{M} \right\}$ is the error correlation matrix $\hat{\mathbf{v}} = \mathbf{E} \left\{ \gamma \mathbf{M} \right\}$ is the conjugate transpose $\hat{\mathbf{v}} = \mathbf{E} \left\{ \gamma \mathbf{M} \right\}$ $\hat{\mathbf{v}} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{MSE} = \mathbf{K}_{Y}\mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{Y}\mathbf{P}^{H} + \mathbf{K}_{H}\right]^{-1}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the error correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the error correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the correlation matrix w}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{\mu} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{W} = \mathbf{W}r$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\hat{\boldsymbol{\gamma}} = \mathrm{E} \{ \gamma \} \text{ is the error correlation matrix } \mathbf{W}$ $\hat{\boldsymbol{\gamma}} = \mathrm{E} \{ \gamma \} \text{ is the error correlation matrix } \mathbf{H}_{n} = \mathrm{E} \{ \gamma \} \text{ is the noise covariance matrix } \mathbf{H}_{n} = \mathrm{E} \{ \gamma \} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}}_{n} = \mathrm{E} \{ \gamma \} \text{ is the conjugate transpose}$
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$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{w}} = \mathbf{W}$ $\hat{\mathbf{W} = \mathbf{W}$ $\hat{\mathbf{W} = \mathbf{W}$ $\hat{\mathbf{W} = \mathbf{W}$ $\hat{\mathbf{W} =$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{\ \mu} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{MSE} = \mathbf{K}_{\gamma}\mathbf{P}^{\mu} \left[\mathbf{P}\mathbf{K}_{\gamma}\mathbf{P}^{\mu} + \mathbf{K}_{\mu}\right]^{-1}$ $\overset{1}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the error correlation matrix } \mathbf{W}$ $\overset{2}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the error correlation matrix } \mathbf{W}$ $\overset{3}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the conjugate transpose}$ $\overset{3}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the conjugate transpose}$ $\overset{4}{}_{\gamma} = \mathbf{E}\left\{\gamma\gamma\right\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{K}_{i}^{H} \mathbf{P}_{i}^{H} + \mathbf{K}_{i}^{H}$ $\hat{\gamma}_{i}^{H} = \mathbf{K}_{i}^{H} \mathbf{P}_{i}^{H} + \mathbf{K}_{i}^{H} + \mathbf{K}_{i$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{\mu}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{\mu} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mu} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimation error.$ $\mathbf{H} priori estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of such as the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct the most estimates of SNR can be used to construct to the most estima$
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$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{\Gamma}$ $\hat{\boldsymbol{\gamma}} = \mathbf{F}_{i}^{H} \mathbf{\Gamma}_{i}^{H} \mathbf{\Gamma}_{i}^{H} \mathbf{\Gamma}_{i}^{H} \mathbf{\Gamma}_{i}^{H}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E}_{i}^{H} \mathbf{\Gamma}_{i}^{H} \mathbf$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{I}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{I}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{I}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{I}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{I}_{i} \mathbf{F}_{i} \mathbf{F}_{$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i}\mathbf{P}^{H} + \mathbf{K}_{in} \int_{-1}^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{F}_{i}\mathbf{P}^{H} + \mathbf{K}_{in} \int_{-1}^{-1} \mathbf{r}$ $\mathbf{W} = \mathbf{F}_{i}\mathbf{P}^{H} + \mathbf{K}_{in} \int_{-1}^{-1} \mathbf{F}_{i}\mathbf{P}^{H} + \mathbf{F}_{in} \int_{-1}^{-1} \mathbf{F}_{in} + \mathbf{F}_{$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $(\mathbf{M}\mathbf{MSE} = \mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} \left[\mathbf{P}\mathbf{K}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} + \mathbf{K}_{\mathbf{n}}\right]^{-1} \mathbf{r}$ $(\mathbf{M}\mathbf{MSE} = \mathbf{F}_{\mathbf{\gamma}}\mathbf{P}^{\mathbf{H}} \mathbf{P}^{\mathbf{H}} $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{w}} $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{K}_{i} \mathbf{P}^{H} [\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i}]^{-1}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{P}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{P}_{i} + \mathbf{K}_{i}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{P}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{P}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{P}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{F}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{\mu} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{\mu} \mathbf{r}$ $\hat{\boldsymbol{\gamma}}_{i} = \mathbf{K}_{i}^{\mu} \mathbf{P}_{i}^{\mu} + \mathbf{K}_{i}^{\mu} \right]^{-1}$ $\stackrel{1}{}_{i} = \mathbf{F}_{i}^{\mu} \mathbf{P}_{i}^{\mu} \mathbf{r}$ $\stackrel{1}{}_{i} = \mathbf{F}_{i}^{\mu} \mathbf{P}_{i}^{\mu} P$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{K}_{i}^{H} \mathbf{P}_{i}^{H} \left[\mathbf{P} \mathbf{K}_{i}^{H} \mathbf{P}_{i}^{H} + \mathbf{K}_{i}^{H} \right]^{-1}$ $\stackrel{\text{estimator matrix w}}{=} \mathbf{E} \left\{ \gamma \gamma \right\}$ is the noise covariance matrix $\hat{\boldsymbol{\gamma}}_{i}^{H} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the noise covariance matrix $\hat{\boldsymbol{\gamma}}_{i}^{H}$ is the conjugate transpose $\hat{\boldsymbol{\gamma}}_{i}^{H}$
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$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{w}} $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\gamma} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{(4)}{\rightarrow} \mathrm{Eflitet}.$ $\overset{(-))}{\rightarrow} \mathrm{Ef} \left\{ \gamma / \right\} \mathrm{is the error correlation matrix}$ $\overset{(+))}{\rightarrow} \mathrm{Ef} \left\{ \gamma / \right\} \mathrm{is the error correlation matrix}$ $\overset{(+))}{\rightarrow} \mathrm{Ef} \left\{ \gamma / \right\} \mathrm{is the conjugate transpose}$ $\overset{(-))}{\rightarrow} \mathrm{is the conjugate transpose}$ $\overset{(-))}{\rightarrow} \mathrm{Efliter}.$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\mathbf{H}_{i} = \mathbf{W}_{i}$ $\mathbf{H}_{i} = \mathbf{H}_{i}$ $\mathbf{H}_{i} = \mathbf$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{1}{\rightarrow} \mathbf{F} interver equation (1) = 100 \text{ matrix } \mathbf{W}$ $\stackrel{2}{\rightarrow} = \mathbf{E} \left\{ \gamma \mathbf{Y} \right\} \text{ is the error correlation matrix}$ $\stackrel{2}{\rightarrow} = \mathbf{E} \left\{ \gamma \mathbf{Y} \right\} \text{ is the conjugate transpose}$ $\stackrel{2}{\rightarrow} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the conjugate transpose}$ $\stackrel{3}{\rightarrow} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\} \text{ is the conjugate transpose}$
$\hat{\gamma}_{,} = \mathbf{w}_{,}^{\mu} \mathbf{r}$ $\hat{\gamma} = \mathbf{E}_{,}^{\mu} \mathbf{P}_{,\mu}^{\mu} [\mathbf{P} \mathbf{K}_{,\mu} \mathbf{P}^{\mu} + \mathbf{K}_{,\mu}]^{-1}$ $\hat{\gamma}_{,\mu}^{\mu} = \mathbf{E}_{,\mu}^{\mu} \mathbf{P}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu}$ $\hat{\gamma}_{,\mu}^{\mu} = \mathbf{E}_{,\mu}^{\mu} \mathbf{P}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu}$ $\hat{\gamma}_{,\mu}^{\mu} = \mathbf{E}_{,\mu}^{\mu} \mathbf{P}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu}$ $\hat{\gamma}_{,\mu}^{\mu} = \mathbf{E}_{,\mu}^{\mu} \mathbf{P}_{,\mu}^{\mu} \mathbf{R}_{,\mu}^{\mu} \mathbf{R}_{,\mu$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{w}}_{i} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{F} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\frac{1}{2} \mathbf{E} \left\{ \mathbf{F} \mathbf{K}_{\gamma} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} \mathbf{E} E$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{M}}_{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{-}{}_{i} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $, = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the noise covariance matrix $(\cdot)^{H}$ is the conjugate transpose $(\cdot)^{H}$ is the conjugate transpose $(\cdot)^{H}$	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{\mathbf{n}} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{\mathbf{n}} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \mathbf{W} \mathbf{M} \mathbf{SE} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{n}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{n}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{SE} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{n}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathbf{n}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{H} \mathbf{P} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{H} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{H} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{H} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} = \mathbf{E} \{ \gamma ' \} \text{ is the error correlation matrix } \mathbf{u}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \text{ is the noise covariance matrix} \\ \mathbf{H}^{\mathbf{e}} = \mathbf{E} \{ \gamma ' \} \text{ is the conjugate transpose} \\ \mathbf{H}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.} \\ \mathbf{W}^{\mathbf{e}} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{w}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{j} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{\circ}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the error correlation matrix}$ $\stackrel{\circ}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the correlation matrix}$ $\stackrel{\circ}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the correlation matrix}$ $\stackrel{\circ}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the conjugate transpose}$ $\stackrel{\circ}{\rightarrow} (.)^{"} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\mathbf{M}}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\frac{1}{2} \mathbf{F}_{i} \mathbf{P}_{i} \mathbf{r}$ $\frac{1}{2} \mathbf{F}_{i}^{H} \mathbf{F}_{i} \mathbf{F}_{i}^{H} \mathbf{F}_{i} \mathbf{F}_{i}^{H} F$	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{"}\mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{"}\mathbf{r} \\ \hat{\gamma} &= \mathbf{W}\mathbf{r} \\ \hat{\gamma} &= \mathbf{W}\mathbf{r} \\ \hat{\mathbf{M}} &= \mathbf{W}\mathbf{r} \\ \mathbf{M}\mathbf{MSE} &= \mathbf{K}_{\gamma}\mathbf{P}^{"} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\gamma}\mathbf{P}^{"} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} & \text{priori estimates of SNR can be used to construct the MMSE filter.} \\ \mathbf{M} &= \mathbf{E}\{\gamma\gamma\} \text{ is the error correlation matrix} \\ \hat{\mathbf{e}} &= \mathbf{E}\{\gamma\gamma\} \text{ is the error correlation matrix} \\ \hat{\mathbf{e}} &= \mathbf{E}\{\gamma\gamma\} \text{ is the conjugate transpose} \end{aligned}$	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{\ \mathbf{n}} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{\ \mathbf{n}} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\mathbf{M}} \mathbf{R} \mathbf{r} \\ \hat{\mathbf{M}} \mathbf{R} \mathbf{r} \\ \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} &= \mathbf{H} \mathbf{P} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \mathbf{H} \mathbf{H} \mathbf{M} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} H$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"}\mathbf{r}$ $\hat{\mathbf{v}} = \mathbf{E}_{i}^{"}\mathbf{v}^{"}\mathbf{r}$ $\hat{\mathbf{v}} = \mathbf{E}_{$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W} = \mathbf{W}_{i} \mathbf{E} \text{ filter.}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W} = \mathbf{W}_{i} \mathbf{W}$	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{H} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{H} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \mathbf{r} \\ \hat{\mathbf{M}} \mathbf{m} \mathbf{E} \\ \hat{\mathbf{M}} &= \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \\ \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{E} \text{filter.} \\ \mathbf{M} \mathbf{M} \mathbf{N} \mathbf{E} \text{filter.} \\ \mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{W} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \\ \mathbf{H} \mathbf{P} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} \mathbf{H} H$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\stackrel{\mathbf{H}}{\mathbf{r}} = \mathbf{F}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\stackrel{\mathbf{H}}{\mathbf{r}} = \mathbf{F}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\stackrel{\mathbf{H}}{\mathbf{r}} = \mathbf{F}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\stackrel{\mathbf{H}}{\mathbf{r}} = \mathbf{F}_{\mathbf{r}} \mathbf{P}^{\mathrm{H}} \mathbf{r} \mathbf{P}^{\mathrm{H}} \mathbf{r} \mathbf{P}^{\mathrm{H}} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{\ \mathbf{n}} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{\ \mathbf{n}}$ $\hat{\gamma} = \mathbf{W}_{i}^{\ \mathbf{n}}$ $\hat{\gamma} = \mathbf{W}_{i}^{\ \mathbf{n}}$ $\hat{\gamma} = \mathbf{W}_{i}^{\ \mathbf{n}} \mathbf{r}$ $\hat{\gamma} = \mathbf{E}_{i}^{\ \mathbf{n}} \mathbf{P}^{\text{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\text{H}} + \mathbf{K}_{n} \right]^{-1}$ $\stackrel{\text{estimator matrix w}}{\overset{\text{estimator matrix w}}{\text{estimator would we $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{I}_{i} \mathbf{F}_{i} \mathbf{I}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{H}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n}$ $\frac{1}{\rho} \mathbf{H}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{E}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{E}_{i} \mathbf{F}_{i} \mathbf{F}_{i} \mathbf{F}_{i}$ $\frac{1}{\rho} \mathbf{E}_{i} \mathbf{F}_{i} $	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{"}\mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{"}\mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{"}\mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \\ \hat{\gamma} &= \mathbf{W} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{E} \\ \mathbf{E} \\ \mathbf{K}_{\gamma} \\ \mathbf{P}^{"} \\ \mathbf{P} \\ \mathbf{K}_{\gamma} \\ \mathbf{P}^{"} + \mathbf{K}_{n} \\ \end{bmatrix}^{-1} \\ \mathbf{M} \\ \mathbf{P} \\ \mathbf{K}_{\gamma} \\ \mathbf{P}^{"} \\ \mathbf{F} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{K} \\ \mathbf{H} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{K} \\ \mathbf{H} \\ \mathbf{K} \\ \mathbf{H} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{K} \\ \mathbf{H} \\ \mathbf{M} \\ $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\mathbf{MMSE} filter.$ $\mathbf{MMSE} filter.$ $\mathbf{MMSE} filter.$ $\mathbf{W} eight vector is a compromise between noise and clutter.$ $\mathbf{W} eight vector is a compromise between noise and clutter.$ $\mathbf{W} eight vector is a compromise between noise and clutter.$ $\mathbf{W} is the conjugate transpose$ $\mathbf{H} uge computational load involved due to inverse$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma}_{i} = \mathbf{F}_{i}^{H} \mathbf{p}^{H} \left[\mathbf{P} \mathbf{K}_{i}^{H} \mathbf{p}^{H} + \mathbf{K}_{i}^{H} \right]^{-1}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E}_{i}^{H} \gamma^{P} \mathbf{i} = \mathbf{E}_{i}^{H} \gamma^{P} \mathbf{i} + \mathbf{K}_{i}^{H}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E}_{i}^{H} \gamma^{P} \mathbf{i} = \mathbf{E}_{i}^{H} \gamma^{P} \mathbf{i} + \mathbf{K}_{i}^{H}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E}_{i}^{H} \gamma^{P} \mathbf{i} = \mathbf{E}_{i}^{H} \mathbf{i} = \mathbf{E}_{i$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\mathbf{M}}_{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the onise covariance matrix } \mathbf{w}$ $\overset{-}{}_{\tau} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose } \mathbf{w}$	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{"} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W}_{i}^{"} \mathbf{r} \\ \hat{\gamma} &= \mathbf{W} \\ \hat{\gamma} &= \mathbf{W} \\ \hat{\gamma} &= \mathbf{W} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{E} \\ \mathbf{E} \\ \mathbf{K} \\ \mathbf{V} \\ \mathbf{P} \\ \mathbf{H} \\ \mathbf{P} \\ \mathbf{K} \\ \mathbf{P} \\ \mathbf{H} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{K} \\ \mathbf{H} \\ \mathbf{M} \\ \mathbf{M} \\ \mathbf{K} \\ \mathbf{M} $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} \mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{1}{\mathbf{P}} \mathbf{r}$ $\overset{2}{\mathbf{P}} \mathbf{r}$ $\overset{2}{\mathbf$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma}_{i} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{\mathbf{M}}{=} \mathbf{E}_{i}^{H} \mathbf{\gamma}^{H} \mathbf{i}$ $\stackrel{\mathbf{M}}{=} \mathbf{E}_{i}^{H} \mathbf{i}$ $\stackrel{\mathbf{M}}{=} $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\stackrel{\bullet}{=} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\stackrel{\bullet}{=} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\stackrel{\bullet}{=} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\stackrel{\bullet}{=} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\stackrel{\bullet}{=} \mathbf{H}_{\psi} \mathbf{D} \mathbf{E} \mathbf{E} \left\{ \mathbf{W} \right\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} \mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}_{i} \mathbf{P}^{H} [\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i}]^{-1}$ $\frac{1}{i} \mathbf{P} \mathbf{i} \mathbf{r}$ $\frac{1}{i} \mathbf{P} \mathbf{r}$ $\frac{1}{i} \mathbf{r}$ $$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\mathbf{H}_{i} \mathbf{r}$ \mathbf{R} $\mathbf{H}_{i} \mathbf{r}$ \mathbf{R}
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{r}}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\overset{1}{}_{i} = \mathrm{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\overset{i}{}_{i} = \mathrm{E} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $(.)^{"}$ is the conjugate transpose $(.)^{"}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\stackrel{\bullet}{\rightarrow} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{n} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{w}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\stackrel{\bullet}{\rightarrow} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$	$\begin{split} \hat{\gamma}_{i} &= \mathbf{W}_{i}^{\ H} \mathbf{r} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W}_{i}^{\ H} \mathbf{r} \\ \hat{\boldsymbol{\gamma}} &= \mathbf{W} \mathbf{r} \\ \mathbf{MMSE} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}^{\mathrm{I}} \\ \mathbf{MMSE} &= \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}^{\mathrm{I}} \\ \mathbf{MMSE} \text{ filter.} \\ \mathbf{H} &= \mathbf{M} \mathbf{MSE} \text{ filter.} \\ \mathbf{H} \text{ mMSE} \text{ filter.} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the MMSE filter.} \\ \mathbf{H} \text{ mMSE} \text{ filter.} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the mose and construct the mMSE filter.} \\ \mathbf{H} \text{ is the error correlation matrix} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the mose and construct the mMSE filter.} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the mose and construct the mose and construct the mMSE filter.} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the mose and construct the mose and construct the mose covariancematrix} \\ \mathbf{W} \text{ estimates of SNR can be used to construct the mose and construct the mose covariancematrix} \\ \mathbf{W} \text{ estut is minimum estimates of SNR can be used to construct (construct the conjugate transpose).} \\ \mathbf{W} \text{ estut is minimum estimation error.} \\ \mathbf{W} \text{ estut is minimum estimation error.} \\ \mathbf{W} \text{ estut and involved due to inverse} \\ \mathbf{W} \text{ estut and involved due to inverse} \\ \mathbf{W} \text{ estut and involved due to inverse} \\ \mathbf{W} \text{ estut and involved due to inverse} \\ \mathbf{W} \text{ estut and inverse} \mathbf{W} \text{ estimation and inverse} \\ \mathbf{W} \text{ estimates and inverse} \\ \mathbf{W} \text{ estimates and inverse} \\ \mathbf{W} \text{ estimates and inverse} \mathbf{W} \text{ estimates and inverse} \\ \mathbf{W}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{H} + \mathbf{K}_{\mathbf{n}} \right]^{-1}$ $\text{resolution cell and involves with finding the optimal resolution resolutic resolution resolutic resoluti$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} \mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\frac{1}{2} \mathbf{F} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{M} \mathbf{M} \mathbf{N} \mathbf{S} \mathbf{E} \text{ filter.}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\frac{1}{2} \mathbf{E} \left[\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\mathbf{M}}_{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{\circ}{\mathbf{H}} = \mathbf{F}_{i}^{H} \mathbf{\gamma}^{H} \mathbf{r}$ $\overset{\circ}{\mathbf{H}} = \mathbf{F}_{i}^{H} \mathbf{r}$ $\overset{\circ}{\mathbf{H}} \mathbf{r}$ $\overset{\circ}{\mathbf{H}} = \mathbf{F}_{i}^{H} \mathbf{r}$ $\overset{\circ}{\mathbf{H}} \mathbf{r}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{1}{\rightarrow} \mathbf{P}^{i} \mathbf{r}$ $\stackrel{1}{\rightarrow} \mathbf{F}_{i} \mathbf{r}$ $\stackrel{1}{\rightarrow} \mathbf{r}$ $\stackrel{1}{\rightarrow} \mathbf{F}_{i} \mathbf{r}$ $\stackrel{1}{\rightarrow} \mathbf{F}_{i} \mathbf{r}$ $\stackrel{1}{\rightarrow} \mathbf{F}_{i} \mathbf{r}$ $\stackrel{1}{\rightarrow} \mathbf{r}$ 1
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"}$ $\hat{\gamma} = \mathbf{W}_{i}^{"}$ $\hat{\gamma} = \mathbf{W}_{i}^{"}$ $\hat{\mathbf{M}}_{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{\text{estimator matrix w}}{\stackrel{\text{estimator matrix w}}{\text{estima$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} \mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{*}{=} \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\overset{*}{=} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\overset{*}{=} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\overset{*}{=} \text{ Huge computational load involved due to inverse}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{H}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{i} \mathbf{r} \mathbf{r} \mathbf{r}$ $\mathbf{r} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix } \mathbf{W}$ $\mathbf{H} \mathbf{R} \mathbf{F} \mathbf{filter}.$ $\mathbf{F} \mathbf{R} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} r$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\stackrel{1}{\rightarrow} Piiori estimates of SNR can be used to construct the MMSE filter.$ $\stackrel{-}{\rightarrow} = E\{\mathcal{M}\}$ is the error correlation matrix $\stackrel{-}{\rightarrow} = E\{\mathcal{M}\}$ is the noise covariance matrix $\stackrel{-}{,}$ $\stackrel{-}{=} if\{\mathcal{M}\}$ is the conjugate transpose $\stackrel{-}{,}$ $\stackrel{-}{=} Huge computational load involved due to inverse$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\hat{\mathbf{M}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix} \qquad $	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{M}\mathbf{P}iori \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{W} = \mathbf{E}[\mathbf{M}'] \text{ is the error correlation matrix}$ $\hat{\gamma} = \mathbf{E}[\mathbf{M}'] \text{ is the conjugate transpose}$ $\mathbf{M}\mathbf{R} = \mathbf{E}[\mathbf{M}] \mathbf{E} \mathbf{R} + \mathbf{R}_{H} = \mathbf{R}_{\mu}\mathbf{R} = \mathbf{R}_{\mu}\mathbf{R} + \mathbf{R}_{\mu}\mathbf{R}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} \mathbf{M} \mathbf{S} \mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1} \mathbf{I}$ $\mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{M} \mathbf{M} \mathbf{S} \mathbf{E} \text{ filter.}$ $\mathbf{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}$ $\mathbf{W} \mathbf{e} \mathbf{P} \mathbf{H} \mathbf{E} \mathbf{F} \mathbf{H} \mathbf{E}$ $\mathbf{H} \mathbf{P} \mathbf{H}_{\gamma} \mathbf{P}^{H} $	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{\ \mathbf{H}} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{\ \mathbf{H}} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{n} \right]^{-1} \mathbf{r}$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the model of the model term of $
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{M}} = \mathbf{K}\mathbf{r} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{R} \end{bmatrix}^{-1} \mathbf{h}$ $\hat{\mathbf{M}} = \mathbf{K} \mathbf{r} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{R} \end{bmatrix}^{-1} \mathbf{h}$ $\hat{\mathbf{M}} = \mathbf{K} \mathbf{r} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{R} \end{bmatrix}^{-1} \mathbf{h}$ $\hat{\mathbf{M}} = \mathbf{K} \mathbf{r} \mathbf{P}^{\mathrm{H}} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{R} \end{bmatrix}^{-1} \mathbf{h}$ $\hat{\mathbf{M}} = \mathbf{K} \mathbf{r} \mathbf{r} \mathbf{r}$ $\hat{\mathbf{H}} = \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{w} = \mathbf{F}\mathbf{r}$ $\mathbf{w} = \mathbf{r}$ \mathbf{r} $\mathbf{w} = \mathbf{r}$ \mathbf{r} $\mathbf{w} = \mathbf{r}$ \mathbf{r} $\mathbf{r} = \mathbf{r}$ \mathbf{r} $\mathbf{r} = \mathbf{r}$ \mathbf{r} $\mathbf{r} = \mathbf{r}$ \mathbf{r}	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{MMSE}^{H} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the MMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the mMSE filter.$ $\mathbf{H} priori estimates of SNR can be used to construct the moleculation matrix with the moleculation matrix with the moleculation matrix with the moleculation error.$ $\mathbf{H} priori estimate to moleculation error.$ $\mathbf{H} priori estimate to moleculation error.$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{1}{\rightarrow} P_{i} row results of SNR can be used to construct the MMSE filter.$ $\overset{-}{\rightarrow} = \mathbf{E} \{\gamma\gamma\} \text{ is the error correlation matrix w}$ $\overset{-}{\rightarrow} = \mathbf{E} \{\gamma\gamma\} \text{ is the error correlation matrix w}$ $\overset{-}{\rightarrow} = \mathbf{E} \{\gamma\gamma\} \text{ is the conjugate transpose}$ $\overset{-}{\rightarrow} = \mathbf{E} \{\gamma\gamma\} \text{ is the conjugate transpose}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\stackrel{\text{estimator matrix w}}{\overset{\text{estimator w}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{H} \mathbf{r}$ \mathbf{r} r	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{H}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{H}\mathbf{P}iori \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\mathbf{H}\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \mathbf{R}_{i}$ $\mathbf{H}\mathbf{P} \mathbf{R}_{i} \mathbf{P}^{H} \mathbf{R}_{i} \mathbf{R}_{i}$ $\mathbf{H}\mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{i}$ $\mathbf{H}\mathbf{R}_{i} \mathbf{R}_{i} \mathbf{R}_{$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{1}{\rightarrow} Piiori estimates of SNR can be used to construct the MMSE filter.$ $\overset{-}{\rightarrow} = \left[\gamma \gamma \right]$ is the error correlation matrix $\overset{-}{\rightarrow} = \left[\gamma \gamma \right]$ is the conjugate transpose $\overset{-}{\rightarrow} = \mathbf{W} \mathbf{r}$ $\overset{-}{\rightarrow} = \mathbf{F} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $\overset{-}{\rightarrow} = \mathbf{F} \left\{ \gamma \gamma \right\}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\mathbf{\gamma}} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\text{resolution cell and involves with finding the optimal resolution resol$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{H} \mathbf{NMSE} \text{ filter.}$ $\mathbf{H} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{H}_{n}$ $\mathbf{H} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{H}_{n} \mathbf{P} \mathbf{H}_{n} \mathbf{P} \mathbf{H}_{n} \mathbf{P} \mathbf{H}_{n}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \left\{ \gamma \mathbf{\gamma} \right\} \text{ is the error correlation matrix}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \left\{ \gamma \mathbf{\gamma} \right\} \text{ is the conjugate transpose}$ $\hat{\boldsymbol{\gamma}} = \mathbf{E} \left\{ \gamma \mathbf{M} \right\} \text{ is the conjugate transpose}$ $\mathbf{H} \mathbf{U} \mathbf{E} \text{ computational load involved due to inverse}$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P}\mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} \text{ filter.}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} \text{ filter.}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} \text{ filter.}$ $\mathbf{W} = \mathbf{F}\left\{\gamma\gamma\right\} \text{ is the error correlation matrix } \mathbf{w}$ $\mathbf{W} = \mathbf{F}\left\{\gamma\gamma\right\} \text{ is the conjugate transpose}$ $\mathbf{W} = \mathbf{F}\left\{\gamma\mathbf{M}\right\} \text{ is the conjugate transpose}$ $\mathbf{W} = \mathbf{F}\left\{\gamma\mathbf{M}\right\} \text{ is the conjugate transpose}$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{1}{\mathbf{r}} Priori \text{ estimates of SNR can be used to construct the MMSE filter.}$ $\overset{-}{\mathbf{r}} = \mathbf{E} \{\gamma\gamma\} \text{ is the error correlation matrix } \mathbf{w}$ $\overset{-}{\mathbf{r}} = \mathbf{E} \{\gamma\gamma\} \text{ is the error correlation matrix}$ $\overset{-}{\mathbf{r}} = \mathbf{E} \{\gamma\gamma\} \text{ is the conjugate transpose}$ $\overset{-}{\mathbf{r}} \text{ is the conjugate transpose}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K} \mathbf{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{\bullet}{=} \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the error correlation matrix}$ $\stackrel{\bullet}{=} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the error correlation matrix}$ $\stackrel{\bullet}{=} = \mathbf{E} \left\{ \gamma \gamma^{2} \right\} \text{ is the conjugate transpose}$ $\stackrel{\bullet}{=} \text{ Huge computational load involved due to inverse}$	$\hat{\boldsymbol{\gamma}}_{i} = \boldsymbol{w}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \boldsymbol{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W} \mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1} \mathbf{I}$ $\mathbf{H} \mathbf{P} \mathbf{I} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} \mathbf{r} r$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ \mathbf{r} $\mathbf{h} \mathbf{r}$ \mathbf{r}	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{\gamma} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{n} \right]^{-1}$ $\overset{1}{\mathbf{M}} \mathbf{P} \mathbf{r} \mathbf{r} \mathbf{r}$ $\overset{2}{\mathbf{H}} = \mathbf{F} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\mathbf{r}^{\prime} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $(.)^{```}$ is the conjugate transpose $(.)^{```}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}$ $\hat{\mathbf{M}} \mathbf{MSE} = \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{\mathrm{H}} + \mathbf{K}_{\mathrm{H}} \right]^{-1}$ $\stackrel{\text{resolution cell and involves with finding the optimal estimator matrix w}{\text{estimator matrix w}}$ $\stackrel{\text{estimator matrix w}}{= \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\stackrel{\text{resolution cell and involves with finding the optimal resolution cell and involves with finding the optimal resolution cell and involves with finding the optimal resolution that \mathbf{W} \text{resolution cell and involves with finding the optimal resolution cell and involves with finding the optimal resolution resolution resolution resolution is the conjugate transpose (.)" is the conjugate transpose (.)" is the conjugate transpose (.)" and the computational load involved due to inverse (.)" is the conjugate transpose (.)" and the computational load involved due to inverse (.)" is the conjugate transpose (.)" and the computational load involved due to inverse (.)" and the computational load involved due to inverse (.)" and the computational load involved due to inverse (.). (.)" is the conjugate transpose (.). (.)" is the conjugate transpose (.). (.)" is the conjugate transpose (.). (.). (.). (.). (.). (.). (.). (.)$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{n} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{n} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{n} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{n} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{MMSE} = \mathbf{K}_{\gamma} \mathbf{P}^{n} \left[\mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{n} + \mathbf{K}_{n} \right]^{-1}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the error correlation matrix $\hat{\mathbf{r}} = \mathbf{E} \left\{ \gamma \gamma \right\}$ is the conjugate transpose $\mathbf{f} = \mathbf{W} \mathbf{R} = \mathbf{E} \left\{ \gamma \mathbf{W} \right\}$ $\mathbf{F} = \mathbf{E} \left\{ \gamma \gamma \right\}$ $\mathbf{W} = \mathbf{E} \left\{ \gamma \gamma \right\}$ $\mathbf{E} = \mathbf{E} \left$	$\hat{\gamma}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P}\mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{n} \end{bmatrix}^{-1}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} \text{ filter.}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} \text{ filter.}$ $\mathbf{H}\mathbf{P}\mathbf{H}_{r} \mathbf{P}\mathbf{R}_{r} \mathbf$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\gamma} = \mathbf{W}\mathbf{r}$ $\hat{\mathbf{w}} = \mathbf{K}_{Y} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{Y} \mathbf{P}^{H} + \mathbf{K}_{H} \right]^{-1}$ $\stackrel{\bullet}{\mathbf{MMSE}} = \left[\mathbf{F}_{Y} \mathbf{Y} \right] \text{is the error correlation matrix } \mathbf{W}$ $\stackrel{\bullet}{\mathbf{H}} = \mathbf{F} \{ \gamma \mathbf{Y} \} \text{ is the error correlation matrix}$ $\stackrel{\bullet}{\mathbf{H}} = \mathbf{F} \{ \gamma \mathbf{Y} \} \text{ is the conjugate transpose}$ $\stackrel{\bullet}{\mathbf{H}} \text{ uppe computational load involved due to inverse}$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{w}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\hat{\mathbf{w}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{w}} = \mathbf{E} \left\{ \gamma \mathbf{w} \right\} \mathbf{v}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{i} \mathbf{V} \mathbf{r}$ $\mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{\mu} \end{bmatrix}^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} R$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ \mathbf{r} \mathbf{w} \mathbf{r} $$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.}$ $\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.}$ $\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} M$
$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W} \mathbf{r}$ $\hat{\mathbf{w}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the error correlation matrix}$ $\hat{\mathbf{w}} = \mathbf{E} \left\{ \gamma \gamma \right\} \text{ is the conjugate transpose}$ $\hat{\mathbf{w}} = \mathbf{E} \left\{ \gamma \mathbf{w} \right\} \mathbf{v}$	$\hat{\boldsymbol{\gamma}}_{i} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\boldsymbol{\gamma}} = \mathbf{W}\mathbf{r}$ $\mathbf{M}\mathbf{M}\mathbf{S}\mathbf{E} = \mathbf{K}_{\gamma}\mathbf{P}^{H} \begin{bmatrix} \mathbf{P} \mathbf{K}_{\gamma}\mathbf{P}^{H} + \mathbf{K}_{H} \end{bmatrix}^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{i} \mathbf{V} \mathbf{r}$ $\mathbf{H} \mathbf{P} \mathbf{K}_{\gamma} \mathbf{P}^{H} + \mathbf{K}_{\mu} \end{bmatrix}^{-1}$ $\mathbf{H} \mathbf{P} \mathbf{H} \mathbf{P} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} \mathbf{R} R$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{"} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{"} \mathbf{r}$ \mathbf{r} \mathbf{w} \mathbf{r} $$	$\hat{\gamma}_{i} = \mathbf{w}_{i}^{H} \mathbf{r}$ $\hat{\gamma} = \mathbf{W}_{i}^{H} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{r}$ $\hat{\mathbf{M}} \mathbf{r}$ $\hat{\mathbf{r}} = \mathbf{K}_{i} \mathbf{P}^{H} \left[\mathbf{P} \mathbf{K}_{i} \mathbf{P}^{H} + \mathbf{K}_{i} \right]^{-1}$ $\mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.}$ $\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \text{ filter.}$ $\mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{SE} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} \mathbf{M} M$
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an Filtering	Specific Equations	$\gamma(l) = \mathbf{A}(l) \gamma(l-1) + \mathbf{u}(l)$ $\mathbf{r}(l) = \mathbf{P}(l) \gamma(l-1) + \mathbf{n}(l)$ $\mathbf{r}(l) = \mathbf{P}(l) \gamma(l-1) + \mathbf{n}(l)$ $\mathbf{A}(l) \text{ is taken to be an identity matrix}$ $\mathbf{A}(l) \text{ is taken to be an identity matrix}$ $\mathbf{Generally assumed that scattering coefficients}$ are approximately constant with respect to time, space and frequency Radar Measurements are segmented $\gamma(l) = \gamma(l-1) + \mathbf{u}(l)$	ß
Kalma	General Equations	State Equation y(l) = A(l) y(l-1) + w(l) Measurement Equation z(l) = H(l) y(l) + v(l) z(l) = Signal Vector y(l) = State Transition Matrix w(l) = Process Noise w(l) = Process Noise z(l) = Measurement Vector H(l) = Matrix of Constants	Information and Telecommunication Technology Center





Kalman Filter Implementation

Measurement vector **r** is divided into L segments. Image estimate is determined as :

 $\hat{\gamma}(l/l) = \gamma(l-1/l-1) + \mathbf{G}(l)\mathbf{v}(l)$

from innovation **v**: $\mathbf{v}(l) = \mathbf{r}(l) - \mathbf{P}(l)\hat{\gamma}(l-1/l-1)$ from Kalman Gain G : $\mathbf{G}(l) = \mathbf{K}_{\gamma}(l/l-1)\mathbf{P}(l)^{\mathrm{H}} \left[\mathbf{P}(l)\mathbf{K}_{\gamma}(l/l-1)\mathbf{P}(l)^{\mathrm{H}} + \mathbf{K}_{n}(l)\right]^{\mathrm{H}}$

Update Error Covariance $\mathbf{K}_{\gamma}(l/l) = [\mathbf{I} - \mathbf{G}(l)\mathbf{P}(l)]\mathbf{K}_{\gamma}(l/l-1)$ and applied to next iteration



Iterative implementation of MSME

- Process noise is neglected
- Innovation is the new information available in the latest measurement
- Kalman Gain is computed so as to minimize the MSE, and is based on orthogonal principle
- Initially, measurement error due to ambiguities and clutter dominates. in the final stages noise dominates

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Matched Vs. Kalman filter



Matched Filter Estimate



Kalman Filter Estimate

Single Point Target

- Matched Filter unable to resolve range and Doppler Ambiguities
 - Kalman Filter gives Optimal Estimate









Kalman Filtering Process for a Real Scenario





General SAR Image



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Accuracy of Estimate vs. L





1

 $\mathbf{K}_{\gamma}(0) = \sigma_{\gamma}^2 \mathbf{I}$

 σ_{γ}^2 is the expected value of $\left|\gamma\right|^2$ -Accuracy of estimate same as MMSE

•Why is there no improved accuracy?

 Assumption: Scattering Coefficients are approximately constant with time.

Difficult to simulate this variation

 In real time scenarios, there will be improvement if modeled optimally



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Convergence vs. Estimation Error



Estimation error vs. the percentage of measurement vector processed



 Error covariance matrix is computed based on the Measurement correlation matrix

Optimal Initialization





Solution to Problem1







Only Diagonal Elements are considered

Original Image



KF Estimate











Estimate for L = 100Modified KF

- >Only diagonal points are defined in the Error Covariance Matrix
- obtained from a target pixel is uncorrelated > Physical representation: Reflectance to other target pixels.
- are considered in the error covariance matrix implementation so that only diagonal points ▶It is possible to modify the KF



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Solution to Problem 2

Tradeoff offered between accuracy and reduced computational load

>Difficulty level!

>Non linear processing Errors!







Problem 3: Processing Time

SAR processing Time

Proposed Solutions

> Sequential Estimation

> Parallel Processing









Sequential Estimation



Estimation error vs. the percentage of measurement vector processed for different target scattering scenarios



- Is it possible to quantify the accuracy of the estimate in terms of a parameter in the KF?
- Can this parameter be used for all target scenarios?
- Different Scattering Characteristics
- How does the NMSE vary for the above scattering scenarios











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Solution for Problem 3

Tradeoff offered between accuracy and processing speed

Matrix multiplications speed increased using parallel processing

Solution offered for huge matrix sizes





) Inverse using Kalman Filter	Covariance Matrix and computation load	/ and processing speed	g
Summary	omputational Load due tc nplementation of MMSE	ons involving Huge Error ffered between accuracy	ocessing Time)ffered between accuracy .ocessing	36
A STATE OF S	Problem 1: Huge Cc Solution: Iterative in	Problem 2: Operatio Solution: Tradeoff o	Problem 3: Huge Pro Solution: Tradeoff C Parallel Pr	Information and Telecommunication Technology Center



