



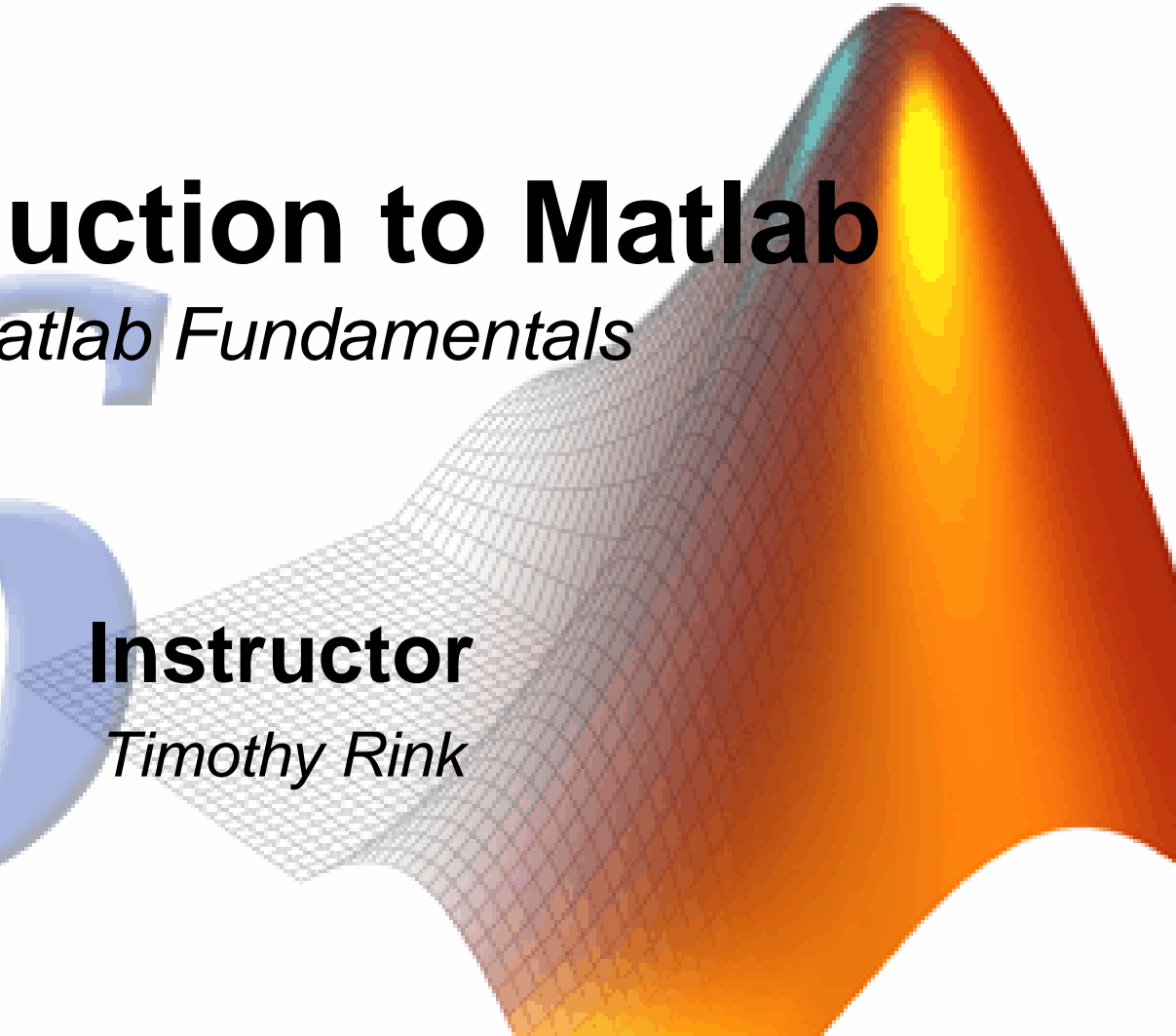
Introduction to Matlab

Matlab Fundamentals

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Instructor

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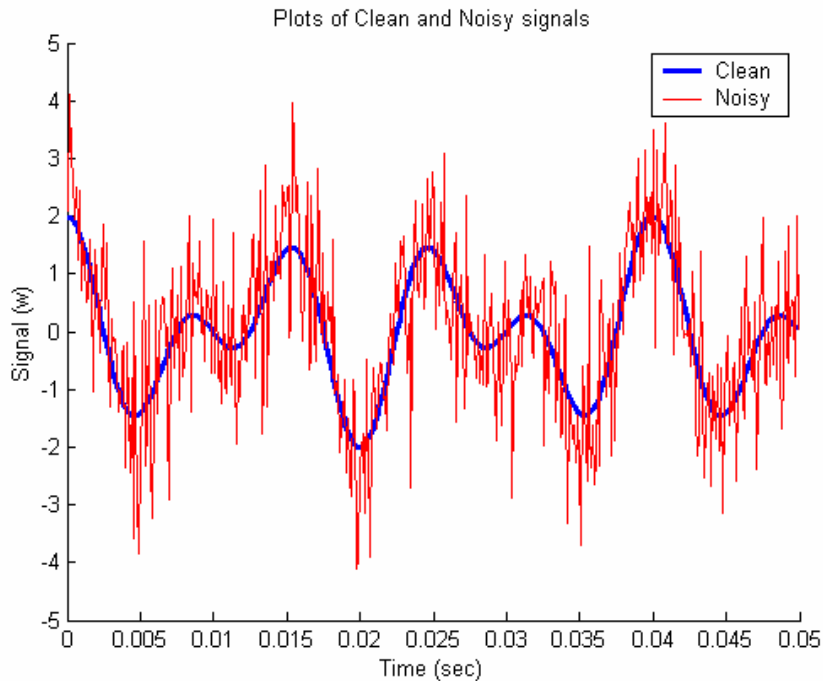


Overview

- What is Matlab?
 - Mathematical tool
 - Programming language
- Capabilities
 - Numerical / Discrete calculations
 - Limited symbolic math (with trickery)
 - Variable driven solutions
 - Graphing (2D / 3D)



Overview



```
C:\KU Classes\EECS 721\Programs\project2.m
File Edit View Text Debug Breakpoints Web Window Help
[Icons] Stack: X
21 %Chebychef method
22 a=zeros(1,M);
23 P=N-1;
24 Ro=10^(s1/20);
25 Zo=cosh(1/(N-1))*acosh(Ro);
26 T=findcheby(P);
27
28 if(flag==0)
29     for n=1:M
30         c=0;
31         for m=2:n
32             x=T((N-2*(m-2)),N-2*(n-1));
33             y=(M-m+2);
34             c=c+T((N-2*(m-2)),N-2*(n-1))*a(M-m+2);
35         end
36         r=T(N-2*(n-1),N-2*(n-1));
37         a(M-n+1)=(T(N,N-2*(n-1))*Zo^(P-2*(n-1))-c)/T(N-2*(n-1),N-2*
38     end
39 end
40 if(flag==1)
41     for n=1:M+1
42         c=0;
43         for m=2:n
44             x=T((N-2*(m-2)),N-2*(n-1));
45             y=(M-m+2);
46             c=c+T((N-2*(m-2)),N-2*(n-1))*a(M-m+2);
47         end
48         r=T(N-2*(n-1),N-2*(n-1));
49         if(n==1)
50             a(1)=Zo^P;
```



Operators

- Matlab “thinks” in matrices

$$2 + 3 = 5 \rightarrow [2] + [3] = [5]$$

- Matrix products use vector multiplication

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 5 & 6 \\ 7 & 8 \end{bmatrix} = \begin{bmatrix} 19 & 22 \\ 43 & 50 \end{bmatrix}$$



Operators

Mathematical Operators

Add	+
Subtract	-
Multiply	*
Divide	/
Power	^
Transpose	\` (single quote)
e^a	<code>exp(a)</code>
$\ln(a)$	<code>log(a)</code>
$\log_{10}(a)$	<code>log10(a)</code>
\sqrt{a}	<code>sqrt(a)</code>



Operators

Logical Operators

And	<code>&</code>
Or	<code> </code>
Xor	<code>xor</code>
Not	<code>~</code>
Equal To	<code>==</code>
Not Equal To	<code>~=</code>

Other Operators

Comment	<code>%</code>
Output Suppress	<code>;</code> (semicolon)



M-files

- M-files

- Use for batch execution of commands
- Dynamic user input programs
- Loops / conditional execution

- M-file related commands

- `edit('filename.m')` ~ opens / creates an m-file
- `%` ~ comment operator (ignore line)



Help

- Matlab Help
 - Each command demands certain syntax
 - Typing '`help command`' shows syntax for each command