

Direct form II Implementation

Difference equation

$$y[n] = b_0x[n] + b_1x[n - 1] + b_2x[n - 2] - a_1y[n - 1] - a_2y[n - 2]$$

System transfer function $H(z)$

$$H(z) = \frac{Y(z)}{X(z)} = \frac{b_0 + b_1z^{-1} + b_2z^{-2}}{1 + a_1z^{-1} + a_2z^{-2}}$$

$$H_1(z) = b_0 + b_1z^{-1} + b_2z^{-2}$$

$$H_2(z) = \frac{1}{1 + a_1z^{-1} + a_2z^{-2}}$$

$$F(z) = H_2(z)X(z)$$

$$Y(z) = H_1(z)F(z)$$

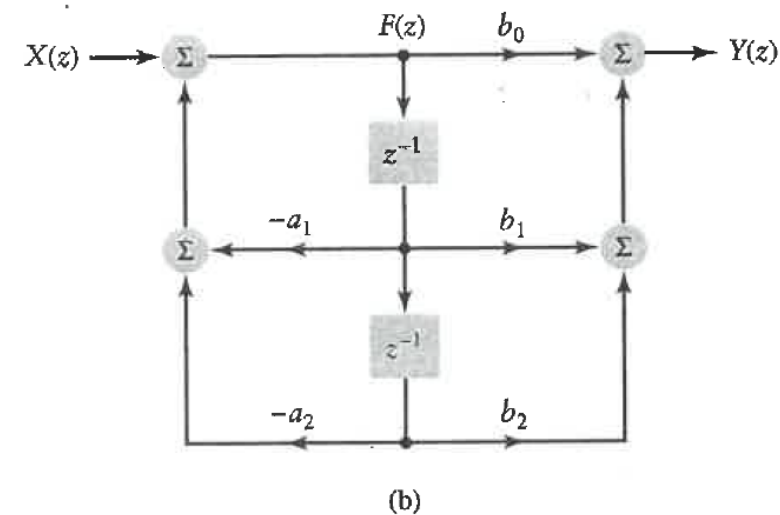
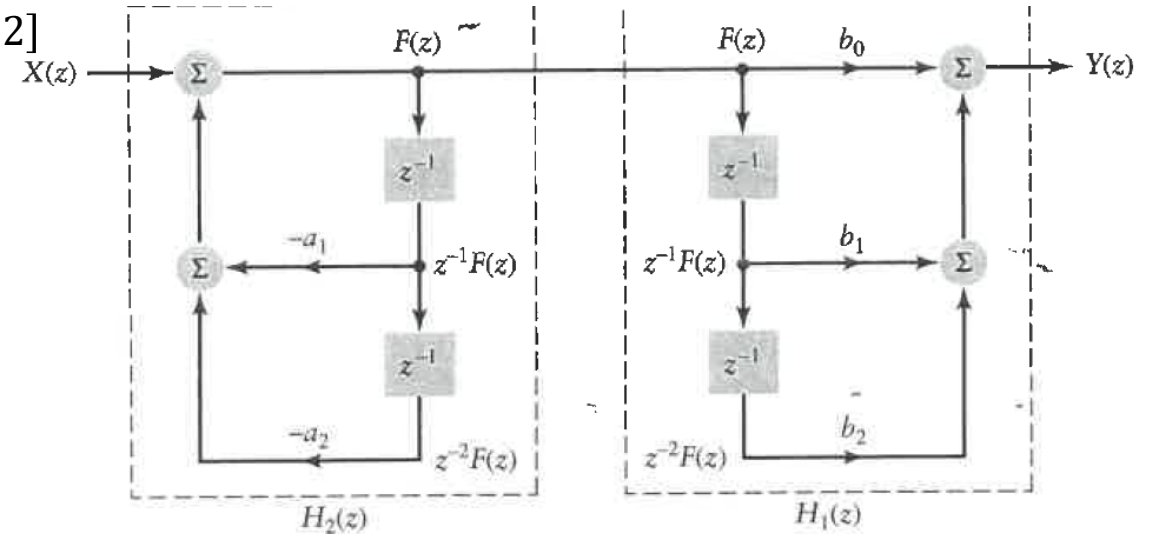


FIGURE 7.24 Development of the direct form II. (a) Representation of the transfer function $H(z)$ as $H_1(z)H_2(z)$. (b) Direct form II implementation of the transfer function $H(z)$ obtained from (a) by collapsing the two sets of z^{-1} blocks.