$$H(z) = \frac{Y(z)}{X(z)}$$
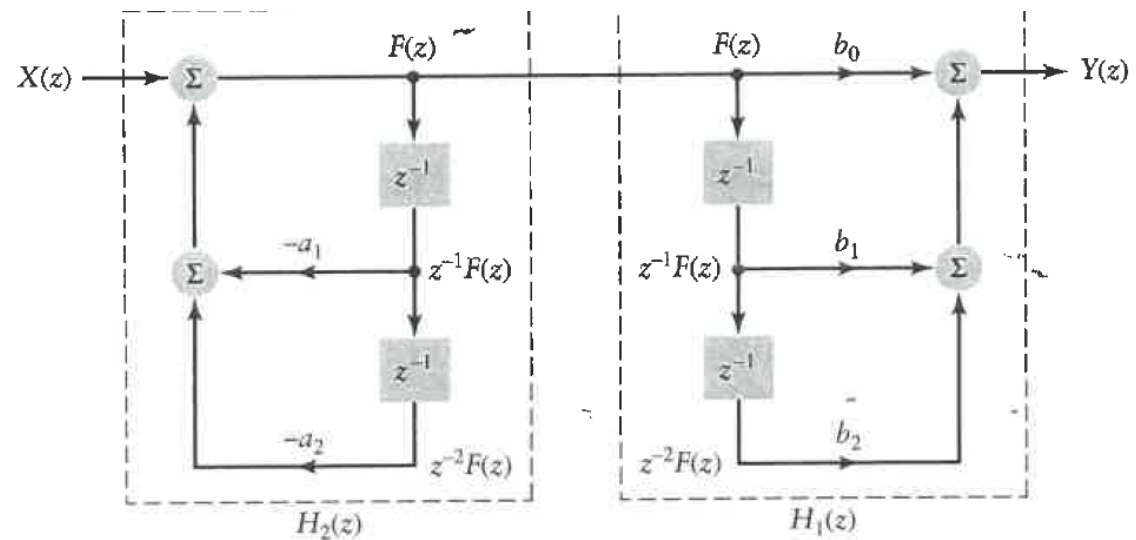
$$= \frac{b_0 + b_1 z^{-1} + b_2 z^{-2}}{1 + a_1 z^{-1} + a_2 z^{-2}}$$
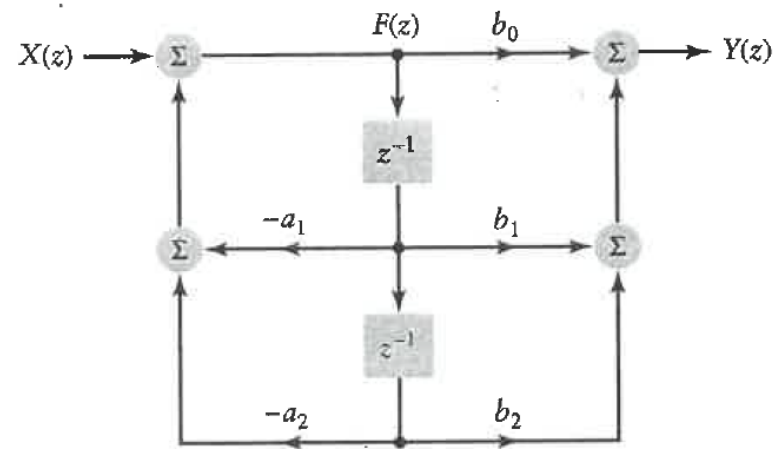
$$H_1(z) = b_0 + b_1 z^{-1} + b_2 z^{-2}$$

$$H_2(z) = \frac{1}{1 + a_1 z^{-1} + a_2 z^{-2}}$$

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

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

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.

From: Signals and Systems, by Simon Haykin and Barry Van Veen, Wiley, 1998