

PROBLEM:

Suppose that two filters are cascaded. The system functions are

$$H_1(z) = \frac{3}{1 - \frac{1}{2}z^{-1}} \quad \text{and} \quad H_2(z) = 2 + z^{-1} - z^{-2}$$

- (a) Determine the poles and zeros of $H_1(z)$. If necessary, include poles and zeros at $z = 0$ and at $z = \infty$, and indicate repeated poles or zeros.

POLES =

ZEROS =

- (b) Determine the poles and zeros of $H_2(z)$

POLES =

ZEROS =

- (c) The cascaded system can be combined into one overall system and then described by a single difference equation of the form:

$$y[n] = \alpha y[n - 1] + \beta x[n] + \gamma x[n - 1]$$

Determine the numerical values of α , β and γ .

$\alpha =$ $\beta =$ $\gamma =$