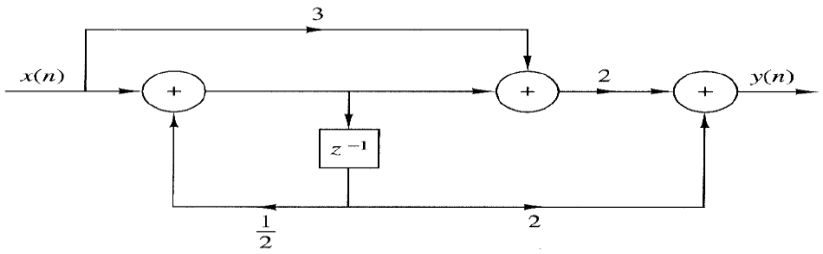
Tutorial Sheet No 7.2

Digital Signal Processing UEC 502

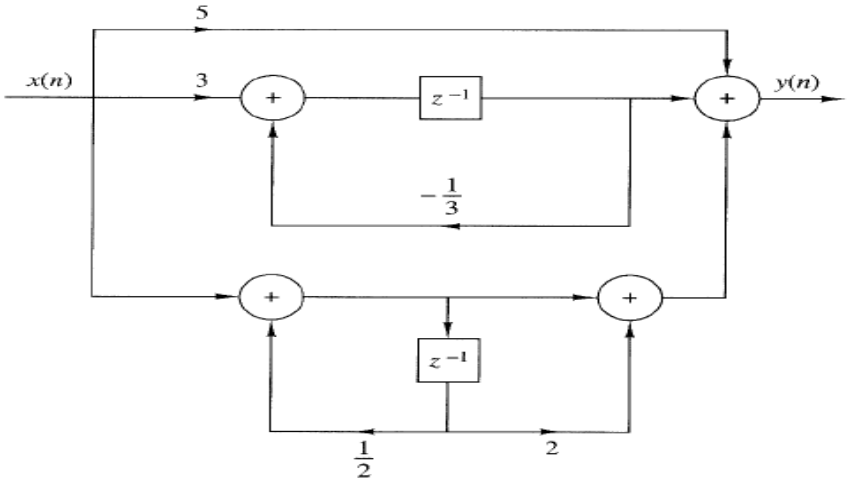
Q1.

Determine the system function and the impulse response of the system shown in Fig. P9.3.



Q2

Determine the system function and the impulse response of the system shown in Fig. P9.4.



Q3.

Consider the filter shown in Fig. P9.7.

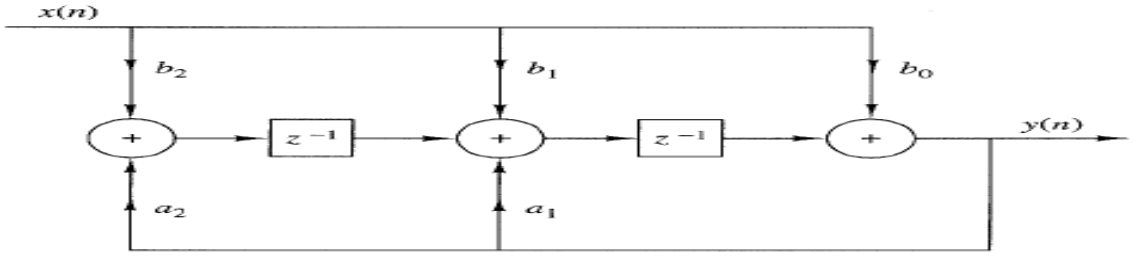


Figure P9.7

(a) Determine its system function.

(b) Sketch the pole–zero plot and check for stability if

1. $b_0 = b_2 = 1, \quad b_1 = 2, \quad a_1 = 1.5, a_2 = -0.9$

2. $b_0 = b_2 = 1, \quad b_1 = 2, \quad a_1 = 1, a_2 = -2$

Q4

Obtain the direct form I, direct form II, cascade, and parallel structures for the following systems.

(a) $y(n) = \frac{3}{4}y(n-1) - \frac{1}{8}y(n-2) + x(n) + \frac{1}{3}x(n-1)$

(b) $y(n) = -0.1y(n-1) + 0.72y(n-2) + 0.7x(n) - 0.252x(n-2)$

(c) $y(n) = -0.1y(n-1) + 0.2y(n-2) + 3x(n) + 3.6x(n-1) + 0.6x(n-2)$