Practice Questions for Unit 2 of DSP

Question Based in Laplace Transform and Inverse Laplace Transform

Question 1

(a) Determine Inverse Laplace Transform of F(s) = (s + 3) / {(s*s) +9s+20}

(b) Determine the Laplace Transform of the rectangular pulse defined as x(t) = 4 for the values of t in the interval 0 to 3 and x(t) = 0 for remaining values of t.

(c) Write down expression to find Laplace transform of signal f(t)

(d) If F(s) = (1 / (s-9)) then find out its inverse Laplace Transform.

(e) If F(s) = (1 / (s+9)) then find out its inverse Laplace Transform.

(f) If H(s) = (5 / (S+4)(S+7)) then find its inverse Laplace Transform.

(g) If u(t) is a continuous unit step function then find out Laplace Transform of u(t) - u(t-8)

(h) Find out Laplace Transform of Cos (at), Sin(at), Cosh (at) and Sinh (at)

(i) Find out impulse response and step response of series R-C circuit and series R-L circuit.

(j) Find the Laplace Transform of a single sawtooth pulse and single rectangular pulse

(k) Locate the poles and zeros for I(s) = (4s / (s+5)(s+8)) using pole-zero diagram and also obtain current i(t).

(l) If F(S) = {4*(S+5)(S+8)} / {(S+3)(S+7)} then find f(t)

Question Based in Z Transform and Inverse Z Transform

Question 2

(a) A system has an impulse response h(n) = (4, 2, 6) and y(n) = (1, 1, 2, -1, 3). Determine the input of the system.

(b) If impulse response of a FIR system is h(n) = (1, 5, 2, 7) then find out its transfer function.

(c) Find initial and final values of the x(n) if Z-transform of x(n) is X(z) = 3 / {(z*z)+(1/4)z-(1/7)}

(d) Determine the value of signal x(n) at n = 0 and n = infinity if X(z) = {6(z*z) +0.25} / {(z+0.3)(z-2)}

(e) Find out Z-transform of discrete unit impulse and discrete unit step function.

(f) Using long division method, determine the inverse Z-transform of H(Z)= {Z*Z / (Z*Z -1.5 Z + 0.5)}