1. (25 points)

a. Find f(t) if

$$F(s) = \frac{s+2}{(s+1)^2(s+4)}$$

b. Plot the poles and zeros of G(*s*) in the *s* plane

$$G(s) = \frac{12+4s}{(s+2)\left(s^2+25\right)\left(s^2+6s+25\right)}$$

c. Find $\lim_{t\to 0+} f(t)$ if

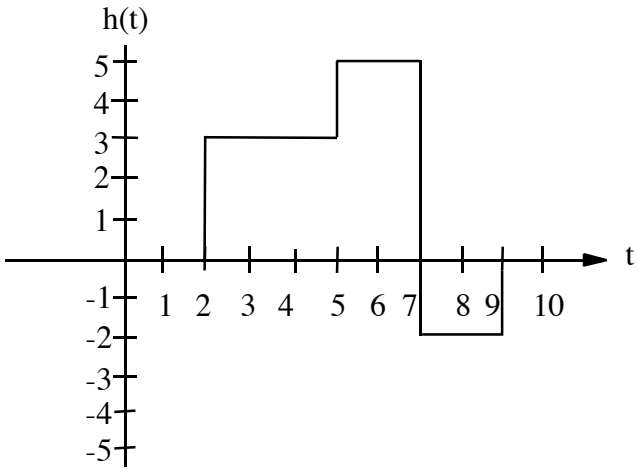
$$F(s) = \frac{3\left(s^3+7s^2+14s+8\right)}{s^4+14s^3+98s^2+350s+625}$$

d. Find $\lim_{t\to \infty} f(t)$ if

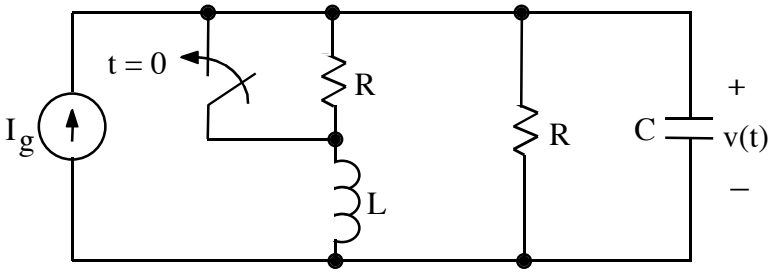
$$F(s) = \frac{2s^4+6s^3+30s^2+25s+120}{s^6+14s^5+112s^4+448s^3+975s^2+625s}$$

(All poles of F(s) are in the left-half plane.)

e. Write an expression for H(*s*).



2. (45 points)



$I_g = 1A$

$R = 4\Omega$

$L = 0.1$ mH

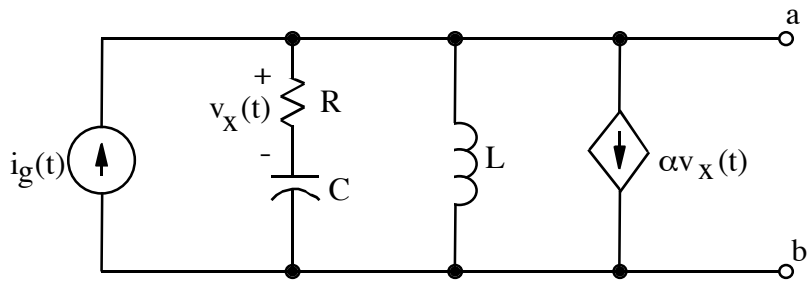
$C = 1\mu F$

The current source is a dc current source. After being open for a long time, the switch is closed at t = 0.

a. Write a numerical time-domain expression for v(t).

b. From the Laplace transform of v(t), find the numerical values of v(t) for $t = 0^+$ and $t \rightarrow \infty$.

3. (30 points)



$i_g(t) = u(t)A$

Construct an s-domain Thevenin's equivalent to the circuit at the terminals a-b. There is no initial energy stored in the circuit.