9-2 Find the Laplace transform of $f(t) = A[(2 - \alpha t)e^{-\alpha t}]u(t)$. Locate the poles and zeros of $F(s)$.

9-3 Find the Laplace transform of $f(t) = A[1 - 2\cos(\beta t)]u(t)$. Locate the poles and zeros of $F(s)$.

9–8 Find the Laplace transforms of the following waveforms and plot their pole-zero diagrams.

(a) $f_1(t) = 3\delta(t) + [10e^{-10t} - 40e^{-40t}]u(t)$

(b) $f_2(t) = [20 - 15\cos(500t)]u(t)$

9–10 Find the Laplace transforms of the following waveforms:

(a) $f_1(t) = 2\delta(t - 2)$

(b) $f_2(t) = e^{-50(t-1)}u(t - 1)$

(c) $f_3(t) = e^{-50(t-2)}u(t - 2)$

9–16 Find the inverse Laplace transforms of the following functions:

(a) $F_1(s) = \dfrac{s + 20}{s(s + 10)}$

(b) $F_2(s) = \dfrac{s^2 + 10s + 10}{s(s + 10)}$

9–19 Find the inverse Laplace transforms of the following functions and sketch their waveforms for $\beta > 0$:

(a) $F_1(s) = \dfrac{\beta(s + \beta)}{s(s^2 + \beta^2)}$

(b) $F_2(s) = \dfrac{s(s + \beta)}{s^2 + \beta^2}$

9-26 Find the inverse transforms of the following functions:

(a) $F_1(s) = \dfrac{(s + 40)^2}{(s + 10)^2(s + 100)}$

(b) $F_2(s) = \dfrac{(s + 10)^2}{(s + 40)^2(s + 100)}$

9–31 Use the Laplace transformation to find the $y(t)$ that satisfies the following first-order differential equations:

(a) $50\dfrac{dy}{dt} + 250y = 0$ with $y(0-) = 10$

(b) $\dfrac{dy}{dt} + 20y = 40u(t)$ with $y(0-) = -10$

9–46 Use the initial and final value properties to find the initial and final values of the waveform corresponding to the transforms in Problem 9–23. If either property is not applicable, explain why.

For Problem 9-46:

9-23 Find the inverse transforms of the following functions:

(a) $F_1(s) = \dfrac{(s + 4)(s + 8)}{s(s + 2)(s + 6)}$

(b) $F_2(s) = \dfrac{3s^4 + 10s^2 + 4}{s(s^2 + 1)(s^2 + 4)}$

9-48 Use the initial and final value properties to find the initial and final values of the waveform corresponding to the following transforms. If either property is not applicable, explain why.

(a) $F_1(s) = \dfrac{s(s+5)}{s^2 + 6s + 9}$

(b) $F_2(s) = \dfrac{10(s^2 + 10s - 20)}{s(s^2 + 100)}$