

A second order system satisfies the following differential equation:

$$d^2x(t)/dt^2 + a_1 dx(t)/dt + a_0 x(t) = 0$$

Calculate the natural complete response  $x_n(t)$  of the system, provided that:

$$a_0 = 13; \quad a_1 = 4; \quad x(0) = 1; \quad dx(0)/dt = 4$$

a.

$$x_n(t) = e^{-2t} (\cos 3t - 2\sin 3t)$$

b.

$$x_n(t) = e^{-3t} (\cos 3t + 2\sin 3t)$$

c.

$$x_n(t) = e^{-2t} (\cos 3t + 2\sin 3t)$$

d.

$$x_n(t) = -e^{-2t} (\cos 3t - 2\sin 3t)$$