
EXERCISE 2.9: Demonstrate that a complex exponential signal can also be a solution to the tuning-fork differential equation:

$$\frac{d^2x}{dt^2} = -\frac{k}{m}x(t)$$

By substituting $z(t)$ and $z^*(t)$ into both sides of the differential equation, show that the equation is satisfied for all t by both of the signals

$$z(t) = Xe^{j\omega_0 t} \quad \text{and} \quad z^*(t) = X^*e^{-j\omega_0 t}$$

Determine the value of ω_0 for which the differential equation is satisfied.

