

Part I Problems and Solutions

In the next two problems, find the unit impulse and the unit step response for

Problem 1: $D + kI$

Solution: $\omega(t) = u(t)e^{-kt}$

$$v(t) = u(t)\frac{1}{k}(1 - e^{-kt})$$

Problem 2: $D^2 + \omega_0^2 I$

Solution: $\omega(t) = u(t)\frac{1}{\omega_0} \sin(\omega_0 t)$

$$v(t) = u(t)\frac{1}{\omega_0^2}(1 - \cos(\omega_0 t))$$

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