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: $w(t) = u(t)e^{-kt}$

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

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

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

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

18.03SC Differential Equations
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