

MTH 256 Lesson 17 - Forced Harmonic Oscillators

1. Find the general solution to the second-order ODE $y'' + 4y = 3x^3$.

2. Find the general solution to the second-order ODE $y'' - 4y = 2e^{2x}$.

3. Suppose you have a mass-spring harmonic oscillator where $m = 1$, $c = 6$, and $k = 9$. However, an outside force is acting on the system via the function $F(t) = t + 12e^{-3t}$. Determine the general solution for this scenario. Then breathe. Then, given time, find the particular solution satisfying $x(0) = 2$ and $x'(0) = -2$.