
Math - 2

Consider the constant coefficient linear non-homogeneous differential equation below, where:

$$M=2.0$$

$$C=0.01$$

$$K= 4.0$$

$$M\ddot{x} + C\dot{x} + Kx = f(t)$$

At $t=0$, an impulse is applied to the system. The value of the impulse is 2.0, The forcing function, $f(t) = 0$ for prior to $t=1$ sec at which point $f(t) = 2.0 \sin(\sqrt{2}t)$.

Find the total solution for this system and plot (sketch) the response between $t=0$ and $t=5$ sec

Point Break down

- a) Identify initial conditions, $x(0) = 0 \quad v(0) = 1$ **(15 points)**
- b) Solve homogeneous equation between 0 and 1 sec **(25 points)**
- c) Sketch **(10 points)**
- d) Identify ICs for part 2 at $t=1$ sec **(15 points)**
- e) Solve total solution **(30 points)**
- f) Sketch **(5 points)**