Part I Problems

Problem 1: For each spring-mass system, find whether pure resonance occurs, without actually calculating the solution.

a) $2x'' + 10x = F(t)$; $F(t) = 1$ on (0,1), $F(t)$ is odd, and of period 2;

b) $x'' + 4\pi^2 x = F(t)$; $F(t) = 2t$ on (0,1), $F(t)$ is odd, and of period 2;

c) $x'' + 9x = F(t)$; $F(t) = 1$ on $(0, \pi)$, $F(t)$ is odd, and of period 2π

Problem 2: Find a periodic solution as a Fourier series to $x'' + 3x = F(t)$, where $F(t) = 2t$ on $(0, \pi)$, $F(t)$ is odd, and has period 2π.

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18.03SC Differential Equations
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