

385 Differential Equations and Orthogonal Functions
Practice Problems for Exam 3

1.

9.1.17, 18

2.

9.2.10

3.

9.3.8,9

4.

Find a solution of

$$2x'' + 32x = F(t),$$

where $F(t)$ is the period 4 function with $F(t) = 5t$ for $-2 < t < 2$.

5.

Find a solution of

$$x'' + 10x = F(t),$$

where $F(t)$ is the period 2 function with $F(t) = 10$ for $0 < t < 1$ and $F(t) = -10$ for $1 < t < 2$.

6.

Solve the boundary value problem

$$\begin{aligned} y_{tt} &= a^2 y_{xx} \\ y(0, t) &= y(L, t) = 0 \\ y(x, 0) &= 0 \\ y_t(x, 0) &= g(x) = \sum_{n=1}^{\infty} \frac{2v_0 L}{n^2 \pi^2} (1 - (-1)^n) \sin \frac{n\pi x}{L}. \end{aligned}$$