

## Dr. Z.'s Calc5 Homework assignment 16

**1.** Solve the boundary value pde problem:

$$\begin{aligned} u_{xx} &= u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ; \\ u(0, t) &= 0 \quad , \quad u(\pi, t) = 0 \quad , \quad t > 0 \quad ; \\ u(x, 0) &= \sin 3x \quad , \quad u_t(x, 0) = \sin 4x \quad , \quad 0 < x < \pi \quad . \end{aligned}$$

**2.** Solve the boundary value pde problem:

$$\begin{aligned} u_{xx} &= u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ; \\ u(0, t) &= 0 \quad , \quad u(\pi, t) = 0 \quad , \quad t > 0 \quad ; \\ u(x, 0) &= 10 \sin x \quad , \quad u_t(x, 0) = 2 \sin 3x \quad , \quad 0 < x < \pi \quad . \end{aligned}$$

**3.** Solve the boundary value pde problem:

$$\begin{aligned} u_{xx} &= u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ; \\ u(0, t) &= 0 \quad , \quad u(\pi, t) = 0 \quad , \quad t > 0 \quad ; \\ u(x, 0) &= x^2(\pi - x) \quad , \quad u_t(x, 0) = 0 \quad , \quad 0 < x < \pi \quad . \end{aligned}$$

**4.** Solve the boundary value pde problem:

$$\begin{aligned} u_{xx} &= u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ; \\ u(0, t) &= 0 \quad , \quad u(\pi, t) = 0 \quad , \quad t > 0 \quad ; \\ u(x, 0) &= 0 \quad , \quad u_t(x, 0) = x(\pi - x)^2 \quad , \quad 0 < x < \pi \quad . \end{aligned}$$

**5.** Solve the boundary value problem

$$\begin{aligned} 9u_{xx} &= u_{tt} \quad , \quad 0 < x < 3\pi \quad , \quad t > 0 \quad ; \\ u(0, t) &= 0 \quad , \quad u(3\pi, t) = 0 \quad , \quad t > 0 \quad ; \\ u(x, 0) &= x(3\pi - x) \quad , \quad u_t(x, 0) = 0 \quad , \quad 0 < x < 3\pi \quad . \end{aligned}$$