Dr. Z.'s Calc5 Homework assignment 16

1. Solve the boundary value pde problem:

$$u_{xx} = u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ;$$

$$u(0,t) = 0 \quad , \quad u(\pi,t) = 0 \quad , \quad t > 0 \quad ;$$

$$u(x,0) = \sin 3x \quad , \quad u_t(x,0) = \sin 4x \quad , \quad 0 < x < \pi \quad .$$

2. Solve the boundary value pde problem:

$$u_{xx} = u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ;$$

$$u(0,t) = 0 \quad , \quad u(\pi,t) = 0 \quad , \quad t > 0 \quad ;$$

$$u(x,0) = 10 \sin x \quad , \quad u_t(x,0) = 2 \sin 3x \quad , \quad 0 < x < \pi \quad .$$

3. Solve the boundary value pde problem:

$$u_{xx} = u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ;$$

$$u(0,t) = 0 \quad , \quad u(\pi,t) = 0 \quad , \quad t > 0 \quad ;$$

$$u(x,0) = x^2(\pi - x) \quad , \quad u_t(x,0) = 0 \quad , \quad 0 < x < \pi \quad .$$

4. Solve the boundary value pde problem:

$$u_{xx} = u_{tt} \quad , 0 < x < \pi \quad , \quad t > 0 \quad ;$$

$$u(0,t) = 0 \quad , \quad u(\pi,t) = 0 \quad , \quad t > 0 \quad ;$$

$$u(x,0) = 0 \quad , \quad u_t(x,0) = x(\pi - x)^2 \quad , \quad 0 < x < \pi \quad .$$

5. Solve the boundary value problem

$$9u_{xx} = u_{tt} \quad , \quad 0 < x < 3\pi \quad , \quad t > 0 \quad ;$$

$$u(0,t) = 0 \quad , \quad u(3\pi,t) = 0 \quad , \quad t > 0 \quad ;$$

$$u(x,0) = x(3\pi - x) \quad , \quad u_t(x,0) = 0 \quad , \quad 0 < x < 3\pi \quad .$$