Dr. Z.'s Calc5 Homework assignment 19

1. Find the Laplace Transform of the pde $19u_{xxx} - 7u_{xx} = u_{tt} + 4u_t - 11u \quad , \quad t > 0.$

2. Find the Laplace Transform of the pde $29u_{xxx} - 17u_{xx} = u_{ttt} + 4u_{tt} - 11u_t + 5u \quad , \quad t > 0.$

3. Find the Laplace Transform of the pde $29u_{xx} + 17u_{xt} + 11u_{tt} = 0 \quad , \quad t > 0.$

4. Solve the pde

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

subject to the **boundary-conditions**

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

and the **initial conditions**

$$u(x,0) = 0 \quad , \quad u_t(x,0) = 3\sin x - 5\sin 4x \quad , \quad 0 < x < \pi \quad .$$

5. Solve the pde

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

subject to the **boundary-conditions**

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

and the **initial conditions**

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

6. Solve the pde

$$u_{xx} + 6\sin 2x \sin t = u_{tt} \quad , 0 < x < \frac{\pi}{2} \quad , \quad t > 0 \quad ,$$

subject to the **boundary-conditions**

$$u(0,t) = 0 \quad , \quad u(\pi/2,t) = 0 \quad , \quad t > 0 \quad ,$$

and the **initial conditions**

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