

題號： 97
科目：微分方程
節次： 2

國立臺灣大學111學年度碩士班招生考試試題

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1. (20 points) Solve the wave equation

$$\begin{cases} u_{tt}(x, t) = u_{xx}(x, t) + x, \\ u(x, 0) = 0, \\ u_t(x, 0) = 0. \end{cases}$$

2. (20 points) Find the solution of the differential equation

$$y'' + y = e^{-t} \cos 2t,$$

satisfying the initial condition

$$y(0) = 2, y'(0) = 1.$$

3. (20 points) Solve the initial value problem

$$\begin{cases} x'(t) = 5x(t) - y(t) + \sin t, \\ y'(t) = 3x(t) + y(t), \end{cases}$$

with initial the condition $(x(0), y(0)) = (1, 2)$.

4. (20 points) Find the solution of the initial value problem

$$9y'' - 6y' + y = 0, y(0) = 2, y'(0) = 1.$$

5. (20 points) Solve the partial differential equation

$$\begin{cases} u_x + u_y + u = e^{x+2y}, \\ u(x, 0) = 0. \end{cases}$$

試題隨卷繳回