

淡江大學九十二學年度碩士班招生考試試題

系別：航空太空工程學系

科目：工程數學

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簡單型計算機 <input checked="" type="checkbox"/>

本試題共 / 頁

1. Solve the initial value problem

$$y'' - 6y' + 18y = 0, \quad y(0) = 0, \quad y'(0) = 6 \quad 15\%$$

2. Solve the initial value problem

$$x^2 y'' - 4xy' + 4y = 0, \quad y(1) = 4, \quad y'(1) = 13 \quad 15\%$$

3. Apply the power series method to solve the following equation

$$y' = 2y \quad 15\%$$

4. Solve the following differential equation by the method of Laplace

$$\text{transforms } y'' + 2y' + 2y = 0, \quad y(0) = 0, \quad y'(0) = 1$$

15%

5. Find the eigenvalues and eigenvectors of the following matrix

$$\begin{bmatrix} 6 & 10 & 6 \\ 0 & 8 & 12 \\ 0 & 0 & 2 \end{bmatrix} \quad 20\%$$

6. Find the temperature, $T(t, x)$, in a laterally insulated bar of length L

whose ends are kept at temperature 0.

$$\frac{\partial T}{\partial t} = c^2 \frac{\partial^2 T}{\partial x^2}, \quad T(t, 0) = 0, \quad T(t, L) = 0$$

The parameter c is a constant, and assuming that the initial

$$\text{temperature is } T(0, x) = \sin \frac{\pi}{L} x, \text{ if } 0 \leq x \leq L \quad 20\%$$