

國立彰化師範大學 97 學年度碩士班招生考試試題

系所： 電信工程學研究所碩士班

科目： 工程數學

☆☆請在答案紙上作答☆☆

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1. Solve the following equation. (20%)

$$x^2 y'' - 5xy' + 9y = x^3$$

2. Find the shortest distance between (3, 2, 1) to the plane $x + 2y + 3z = 1$. (20%)

3. Find the Fourier transform of the following function. (20%)

$$f(x) = xe^{-ax}, \text{ if } -1 < x < 0, f(x) = 0, \text{ otherwise}$$

4. Find the eigenvalues and eigenvectors of A. (20%)

$$A = \begin{bmatrix} 1 & 3 & 2 \\ 0 & -3 & 6 \\ 0 & 1 & 2 \end{bmatrix}$$

5. Evaluate the Laplace transform of the following function. (20%)

$$e^{-3t} \int_0^t e^{3\tau} \cos(2\tau) d\tau$$