

國立彰化師範大學 97 學年度碩士班招生考試試題

系所：積體電路設計研究所碩士班

科目：工程數學

☆☆請在答案紙上作答☆☆

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1. Solve the differential equation $2x^2y'' - 5xy' - 4y = 0$. (10%)

2. Solve the differential equation $y'' + 4y = 8x^2$. (15%)

3. Diagonalize the matrix A, where

$$A = \begin{bmatrix} 7.3 & 0.2 & -3.7 \\ -11.5 & 1.0 & 5.5 \\ 17.7 & 1.8 & -9.3 \end{bmatrix} \quad (10\%)$$

4. Let S be the subspace of \mathbb{R}^4 containing all vectors with $x_1 + x_2 + x_3 + x_4 = 0$ and $x_1 + x_2 - x_3 - x_4 = 0$, find a basis for the space of S. (S = containing all vectors orthogonal to S). (15%)

5. Find a unit normal vector n of $z^2 = 4x^2 + 9y^2$ at the point p:(2,-1,-5).(15%)

6. Describe the region of the following integration and evaluate. (15%)

$$\int_0^1 \int_x^{2x} xy^2 dy dx$$

7. Evaluate the integral(counterclockwise). (20%)

$$\oint_C \frac{3-4z}{(z^3-z)} dz \quad C: |z|=2$$