淡江大學 105 學年度碩士班招生考試試題

系　　電機工程學系　　科目：工程數學 (含線性代數、機率學、常微分方程、複變函數)

別：　積體電路與計算機系統組

考試日期：3 月 5 日(星期六) 第 2 節　　本試題共　4　大題，　1 頁

1. (25%) Find eigenvalues and eigenvector of the following matrix.

$$\begin{bmatrix} 5 & 4 & 2 \\ 2 & 5 & 2 \\ 2 & 2 & 2 \end{bmatrix}$$

2. (25%) Solve the following differential equation.

$$\frac{dy}{dx} - 2x + 1 = 0$$

3. (25%) (a) Find the real and imaginary parts of $f(z)=sin(2z)$. (b) Calculate the complex value of $f(z)$ at $z = \frac{\pi}{3} + \frac{\pi}{4}i$.

4. (25%) Let X be a continuous random variable with cumulative distribution function as follows. (Note, $F(x)=P(X \leq x)$)

(a) Find the probability density function (pdf);

(b) Solve the value of $P(-1<X \leq \frac{1}{2})$.