淡江大學98學年度碩士班招生考試試題

系別：電機工程學系　　科目：工 程 數 學

准帶項目請打「V」	
X	簡單型計算機

本試題共 1 頁，5 大題

(1)Solve the equation

$$y^2 - 6xy + (3xy - 6x^2)y' = 0 \quad (20\%)$$

(2)Solve

$$y'' + 2y' + 2y = \delta(t-3) \qquad y(0)=y'(0)=0 \quad (20\%)$$

(3)(i) Find the eigenvalues and associated eigenvectors

of $\begin{pmatrix} 1 & -10 \\ -1 & 4 \end{pmatrix}$ (10%)

(ii)Solve the system $\begin{pmatrix} y_1'(t) \\ y_2'(t) \end{pmatrix} = \begin{pmatrix} 1 & -10 \\ -1 & 4 \end{pmatrix} \begin{pmatrix} y_1(t) \\ y_2(t) \end{pmatrix} + \begin{pmatrix} e^t \\ \sin(t) \end{pmatrix}$

(10%)

(4) $f(x) = e^{2x}$ for $0 \le x \le 1$.

(i)Find the Fourier cosine series of $f(x)$ (10%)

(ii)Find the Fourier sine series of $f(x)$ (10%)

(5)Evaluate $\int_{-\infty}^{\infty} \frac{3x+2}{x(x-4)(x^2+9)} dx$ (20%)