淡江大學八十七學年度夜間部轉學生入學考試試題

系別：工組三年級　　科目：工程數學

本試題共壹頁

1. Solve the initial value problem

$$2xydx+(4y+3x^2)dy=0, y(1)=-2.$$

2. Use Laplace transform to solve the system

$$x''-2x'+3y'+2y=4$$
$$2y'-x'+3y=0$$
$$x(0)=x'(0)=y(0)=0.$$

3. Solving $X'=AX+G$ by diagonalizing A, where

$$X'=\begin{pmatrix}x_1'\\x_2'\end{pmatrix},\ A=\begin{pmatrix}3&3\\1&5\end{pmatrix},\ \text{and } G=\begin{pmatrix}8\\4e^{3t}\end{pmatrix}.$$

4. Calculate work done by $\vec{F}=\vec{i}-y\vec{j}+xyz\vec{k}$ in moving a particle from (0,0,0) to (1,-1,1) along the curve $x=t, y=-t^2, z=t$ for $0\le t\le 1$.

5. Find the phase angle form of the Fourier series of the function, part of where graph is given in the following diagram.