

國立屏東科技大學 九十三年 學年度 碩士班 甄試招生考試
工程數學 試題

一、 Solve the differential equation, $\ddot{y} - 2\dot{y} = e^x \sin x$. (20%)

二、 Solve $x(t)$, $y(t)$, via Laplace transform, (20%)

$$\text{where } \begin{cases} \frac{dx}{dt} = 2x - 3y, \\ \frac{dy}{dt} = y - 2x, \end{cases} \quad x(0) = 1, \quad y(0) = 2.$$

三、 Find the Fourier series of $f(x)$ on $[-1, 1]$, if $f(x) = \begin{cases} 1 & 0 \leq x \leq 1, \\ -1 & -1 \leq x \leq 0. \end{cases}$ (20%)

四、 Find out the value of line integral

$$\int_C \left\{ \frac{1-y^2}{(1+xy)^2} dx + \frac{1-x^2}{(1+xy)^2} dy \right\}$$

taken along a curve C , where $C: x^2 + y^2 = 3$. (20%)

五、 Compute the eigenvalues of matrix A and the eigenvectors associated with the eigenvalues. (20%)

$$A = \begin{bmatrix} 3 & -2 & -5 \\ 4 & -1 & -5 \\ -2 & -1 & -3 \end{bmatrix}$$