國立彰化師範大學 97 學年度碩士班招生考試試題

系所： ___車輛科技研究所碩士班___　　　　　　科目： ___工程數學___

1. Find a complete solution of the following equation : (20%)

$$y'' + 3y' + 2y = e^{-2x} + x^2$$

2. Determine the Fourier expansions of the periodic functions whose definitions in one period are : (20%)

$$f(t) = \begin{cases} 1 & 0 < t < 1 \\ 0 & 1 < t < 2 \end{cases}$$

3. Find a complete solution of the following system : (20%)

$$(D+1)x + (4D-2)y = t-1$$
$$(D+2)x + (5D-2)y = 2t-1$$

4. Find the solution of the difference equation using Laplace Transform. (20%)

$$y(t+2)-5y(t+1)+6y(t) = 5^t$$

where $y_0 = 1$ and $y_1 = 3$.

5. Calculate $A^3 - 8A^2 + 13A$　(20%)

$$A = \begin{bmatrix} -4 & 5 & 5 \\ -5 & 6 & 5 \\ -5 & 5 & 6 \end{bmatrix}$$