

淡江大學九十四學年度碩士班招生考試試題 (2-1)

系別：土木工程學系

科目：工程數學

准帶項目請打「V」	
✓	簡單型計算機
本試題共 1 頁	

1. Solve the following equations:

(1) $y''' - 5y'' + 3y' + 9y = 0$ (10%)

(2) $\frac{dv}{dt} = g - \frac{c}{m}v$, $v(0) = 0$, g, c, m are constants (10%)

2. Solve the boundary value problem: (25%)

$$\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial z^2}, \quad 0 \leq z \leq 2H, \quad u(0, t) = 0 \quad \text{and} \quad u(2H, t) = 0$$

3. Find the eigenvalues and eigenvectors of $A = \begin{pmatrix} 9 & 1 & 1 \\ 1 & 9 & 1 \\ 1 & 1 & 9 \end{pmatrix}$ (25%)

4. Use the Laplace transform to solve the following initial-value problem.

(1) $y' + 6y = e^{4t}$, $y(0) = 2$ (15%)

(2) $y''' - y' = \sin t$, $y(0) = 2$, $y'(0) = 0$, $y''(0) = 1$ (15%)