

# 淡江大學 108 學年度碩士班招生考試試題

系別：電機工程學系 3 組聯招 科目：工程數學

10-1

考試日期：3 月 10 日(星期日) 第 1 節

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1. Find the solution of the initial value problem :  $y' = -2xy$ ,  $y(0) = 2$  (20%)

2. Find the general solution of the differential equation :  $y'' + y' - 2y = 0$  (20%)

3. Given the matrix  $A = \begin{bmatrix} -5 & 2 \\ 2 & -2 \end{bmatrix}$ , find an orthogonal matrix to diagonalize the matrix  $A$  (20%)

4. Find the Fourier series of the periodic function  $f(x) = \begin{cases} -k & \text{if } -\pi < x < 0 \\ k & \text{if } 0 < x < \pi \end{cases}$   $f(x+2\pi) = f(x)$  (20%)

5. Evaluate the following integral counterclockwise around any simple closed path which includes 0 and 1

$$\oint_C \frac{4-3z}{z^2-z} dz \quad (20\%)$$