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淡江大學 99 學年度碩士班招生考試試題

系別：水資源及環境工程學系

科目：工 程 數 學

准帶項目請打「V」

計 算 機

本試題共 1 頁，5 大題

1. Solve the following equation. (20%)

$$y' = Ay - By^2$$

2. Solve the ordinary differential equation. (20%)

$$x^3 y''' - 6y = 0$$

3. Find the general solution of the given system. (20%)

$$\mathbf{y}' = \begin{bmatrix} 1 & -2 & 2 \\ -2 & 1 & -2 \\ 2 & -2 & 1 \end{bmatrix} \mathbf{y}$$

4. Use Green's theorem to evaluate the given line integral. (20%)

$$\oint_C (x^4 - 2y^3) dx + (2x^3 - y^4) dy,$$

where C is the circle $x^2 + y^2 = 4$

5. Find the directional derivative of f at P in the direction of \mathbf{a} . (20%)

$$f = x^2 + y^2 - z, p : (1, 1, -2), \mathbf{a} = [1, 1, 2]$$