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淡江大學 96 學年度碩士班招生考試試題

系別：航空太空工程學系

科目：工程數學

准帶項目請打「V」

✓

簡單型計算機

本試題共 / 頁

1. Solve the given non-homogeneous differential equation,

$$y'' - 2y' - 3y = 4x - 5 + 6xe^{2x}$$

(20%)

2. Use the Laplace transform method to solve the given initial-value problem,

$$y'' + 16y = \cos 4t, \quad y(0) = 0, \quad y'(0) = 1$$

(20%)

3. Solve the given differential equation subject to the indicated initial conditions,

$$x^2 y'' + xy' + y = 0; \quad y(1) = 1, \quad y'(1) = 2$$

(20%)

4. Use Gaussian elimination or Gauss-Jordan elimination to solve the given system of equations,

$$2x_1 + x_2 + x_3 = 3$$

$$3x_1 + x_2 + x_3 + x_4 = 4$$

$$x_1 + 2x_2 + 2x_3 + 3x_4 = 3$$

$$4x_1 + 5x_2 - 2x_3 + x_4 = 16$$

(20%)

5. Use the method of separation of variables to solve the heat equation

$$\frac{\partial u}{\partial t} = k \frac{\partial^2 u}{\partial x^2}, \quad 0 < x < 1, \quad t > 0, \quad \text{subject to the given conditions}$$

$$u(0, t) = 100, \quad u(1, t) = 100, \quad u(x, 0) = 0$$

(20%)