

大葉大學九十學年度轉學招生考試試題紙

系 別	日\ 第二部	年級	考 試 科 目 (中 文 名 稱)	考試日期	節次	備註
機械系	第二部	三	工 程 數 學	七月 二十四日	三	可攜帶非程式 型計算機

註：考生可否攜帶計算機或其他資料作答，請在備註欄註明（如未註明，一律准攜帶）

1. Solve the following differential equations

(a). $y'' + 4y' + 16y = 0$, $y(0) = 1$ and $y'(0) = 0$ (15%)

(b). $y'' + 4y' + 16y = 8e^{-4x} + \sin(x)$, $y(0) = 0$ and $y'(0) = 0$ (15%)

2. Solve the boundary value problem

$$y'' + \lambda y = 0 , y(-2\pi) = y(2\pi) , y'(-2\pi) = y'(2\pi) \quad (20\%)$$

3. Compute the line integral , where the vector function is

$\vec{F} = (yz^2 - 1)\vec{i} + (xz^2 + e^y)\vec{j} + (2xyz + 1)\vec{k}$ and the integral path C is an unit circle centered at (0,0,0) on the x-y plane that starts from $(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, 0)$ and ends at $(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}, 0)$, clockwise. (15%)

4. Solve the equations
$$\begin{cases} 2x_1 - 3x_2 + x_3 & = & -1 \\ -3x_1 + 2x_2 - 5x_3 & = & 0 \\ -1x_1 & -14x_3 & = & -10 \end{cases}$$
 by

Gauss's elimination methods. (Verify your answers) (15%)

5. For the function $f(x) = |x|$, $-1 \leq x \leq 1$

(a) Write its Fourier series on the domain defined. (15%)

(b) At points $x = -1, 0, 1$, what values will the Fourier series converge to? (5%)