

本試題是否可以使用計算機: 可使用, 不可使用 (請命題老師勾選)

(10%)1. Find the general solution of $y'' + 2y' - 35y = 12e^{5x} + 37\sin 5x$.

(10%)2. Find the general solution of $x^3 y''' - 9x^2 y'' + 33xy' - 48y = 0$.

(10%)3. Find the inverse Laplace transform of $\frac{s+3}{s^2+9}$.

(10%)4. Find the eigenvalues and eigenvectors of $\begin{bmatrix} 4 & -6 & -6 \\ 0 & -2 & 0 \\ 1 & -1 & -1 \end{bmatrix}$.

(15%)5. Evaluate the integral $\iint_S \mathbf{F} \cdot \mathbf{n} \, dA$ by the divergence theorem,

where $\mathbf{F} = [x, y]$, $S: z = 2x + 5y$, $0 \leq x \leq 2$, $-1 \leq y \leq 1$, and \mathbf{n} is a unit normal vector of S .

(15%)6. Solve $u_x - u_y = 0$ by separating variables.

(15%)7. Evaluate the integral $\oint_C \frac{15z+9}{z^3-9z} \, dz$, where $C: |z-3|=2$, counterclockwise.

(15%)8. Evaluate the integral $\int_{-\infty}^{\infty} \frac{dx}{(x^2-2x+5)^2}$.