

Solve the following equations:

(1) $2xydx + (x^2 + 1)dy = 0$

(2) $(x^2 + e^y)dx + (y^3 + xe^y)dy = 0$

(3) $y' = \frac{y}{x} - \tan \frac{3y}{x}$

(4) $y' - 2y = e^{4x}$

(5) $(D^3 - 4D)y = 0$

(6) $(D^2 + 1)y = e^x + 2 \sin 3x$

(7) $(D^2 - 2D - 3)y = 9 + 3e^{2x}$

(8) $(D^2 + 2D + 1)y = x^2 + 3x$

Good Luck

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[1] Using the bisection method, find a root to the equation :

$f(x) = x^3 - 4 + \ln x = 0$ in the interval $[1, 2]$, number of iterations is 3.

[2] Find $f'(0)$ where $f(x) = \begin{cases} \ln(x + 1), & x > 0 \\ x^3, & x \leq 0 \end{cases}$ and $h = 0.1$

[3] Find the integral : (a) $\int_0^2 \frac{1}{x^4-1} dx$ (b) $\int_0^\infty \frac{x}{1+x^5} dx$

[4] Find the curve $y = a + b \ln x$ that fits the data: (1, 3), (2, 4), (4, 7), (5, 13), (6, 20)

Also, find \bar{x} , \bar{y} , σ_x , σ_y cov(x, y) and the correlation coefficient r.

[5] If x is random variable with pdf $f(x) = \frac{3}{2x^2}$, $1 \leq x \leq 3$.

Find μ , σ , $P(x \leq 2)$, $P(x > 1.5)$

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[1] Solve the following equations:

(a) $2xy dx + (1 - y)dy = 0$

(b) $(x - e^y)dx + (y - xe^y)dy = 0$

(c) $y' - 2xy = x^3 e^{x^2}$

(d) $y'' - 2y' + y = 3e^{2x}$

(e) $(D^2 + 4)y = 8 + \cos 3x$

(f) $(D^2 - 1)y = 2 + x^3$

[2] Find Laplace transformation of the following:

(a) $f(t) = t^2 - 3 \cosh 2t$

(b) $f(t) = 2 + e^{2t} \sin t$

(c) $f(t) = t \sin t$

[3] Find the inverse Laplace transform of: (a) $F(s) = \frac{1}{s^2} + \frac{s}{s^2+1}$

(b) $F(s) = \frac{s}{s^2-4s+3}$

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