LUKHDHIRJI ENGINEERING COLLEGE, MORBI

Subject: CVPDE(3130005)   Tutorial- 1(A)   Sem-3   Branch: All

Partial Differential Equations

1. Classify the partial differential equation

$$\frac{\partial^2 z}{\partial x^2} + \frac{\partial^2 z}{\partial y^2} = 0$$

2. If $Pp + Qq = R$ is a Partial Differential then write the value of P, Q, R.

3. Find order and degree of

$$p^2 + qy^2 = y^2 - x^2$$

4. Write the one dimensional heat equation in Partial Differential equation form.

5. Write A.E. of the equation $2r + 5s + 2t = 0$.

6. Which P.D.E is linear (1) $p + 2q = 0$ (2) $p^2 + 5q^2 = 0$

7. Write the P.I. of $(D + 2DD' + 2D')z = x + y$

8. Solve $xr + p = 9x^2y^3$.

9. Write the differential equation $(2x + 3y)p + 4xq - 8pq = x + y$ is linear or not.

10. Write Lagrange's auxiliary equation for partial differential equation.

11. Find the complete integral of $z = xp + yq + pq$.

12. Define singular integral for partial differential equation.

13. Write Charpit's auxiliary equation for partial differential equation.

14. The partial differential equation.

$\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial y^2} = 0$ is linear or not and also write the order.

15. What do you means by eliminating of arbitrary constants for making partial differential equation?

16. Define nonlinear partial differential equation.

17. Give one example of Equations reducible to Homogeneous linear form.

18. In Classification of second order linear PDEs write all condition names for

$B^2 - 4AC < or = or > 0$.

19. Obtained general integral of $p^2 + q^2 = m^2$.

20. Find C.F. of

$$\frac{\partial^2 z}{\partial x^2} - \frac{\partial^2 z}{\partial y^2} = 0.$$

LUKHDHIRJI ENGINEERING COLLEGE, MORBI

Subject: CVPDE(3130005)   Tutorial- 1(B)   Sem-3   Branch: All

1. Solve $\dfrac{\partial^2 u}{\partial x^2} = \dfrac{\partial u}{\partial y} + 2u$

2. Solve $x\dfrac{\partial u}{\partial x} - 2y\dfrac{\partial u}{\partial y} = 0$

3. Solve $\dfrac{\partial u}{\partial x} = 2\dfrac{\partial u}{\partial t} + u$, subject to the condition $u(x,0) = 6e^{-3x}$

4. Solve $4\dfrac{\partial u}{\partial x} + \dfrac{\partial u}{\partial y} = 3u$, subject to the condition $u(0, y) = 3e^{-y} - 5e^{-5y}$

5. Find the solution $u(x, y)$ of the the Partial differential equation $u_{xx} + u_{yy} = 0$ by The method of separation of variables.

6. Solve $\dfrac{\partial u}{\partial y} = k\dfrac{\partial^2 u}{\partial x^2}$, $0 < x < 2\pi$ with the condition $u(x,0) = x^2$, $u(0,t) = u(2\pi, t) = 0$

7. A string of length L initially at rest in its equilibrium position and motion is started by giving each of its points a velocity kx for $0 \le x \le \dfrac{L}{2}$ and $k(L - x)$ for $\dfrac{L}{2} \le x \le L$. Find the displacement $u(x,t)$.

1. Find the Partial Differential equation by eliminating a and b from

$$z = (x + a)(y + b)$$

2. Solve $4r - 4s + t = 16log(x + y)$

3. Solve $4r + 12s + 9t = e^{3x-2y}$

4. Solve $(y + z)p + (z + x)q = (x + y)$.

5. Solve $r - s = sinx.cos2y$.

6. Solve$(D^3 - 2D^2D')z = 2e^{2x} + 3x^2y$.

7. Solve $x^2 \frac{d^2y}{dx^2} - x\frac{dy}{dx} + 2y = xlogx$.

8. Find the complete integral of $(x + y)(p + q)^2 + (x - y)(p - q)^2 = 1$

9. Find general integral of $(2xy - 1)p + (z - 2x^2)q = 2(x - yz)$.

10. Find the Partial Differential equation by eliminating arbitrary function of

$$f(x + y + z, x^2 + y^2 + z^2) = 0.$$

11. Find Partial Differential equation $lx + my + nz = \emptyset(x^2 + y^2 + z^2)$.

12. Solve$p \ tanx + q \ tany = tanz$.

13. Solve $xys = 1$.

14. Solve $t + s + q = 0$