Engineering Mathematics-4

19MHB111A

Tutorial and Assignment-1

Tutorial-1

Form a partial differential equation by eliminating arbitrary constants or arbitrary functions:

1. $z = ax + by + cz$.
2. $(x - a)^2 + (y - b)^2 + z^2 = r^2$.
3. $a(x^2 + y^2) + bz^2 = 1$.
4. $y = f(x - at) + F(x + at)$.
5. $(x + y + z) = f(x^2 + y^2 + z^2)$.

Solve the following partial differential equations:

1. $x^2p + y^2q = z^2$.
2. $(y^2z/x)p + xzq = y^2$.
3. $py + qx = xyz^2(x^2 - y^2)$.
4. $xy^2p - y^3q + axz = 0$.
5. $x(y^2 - z^2)p - y(z^2 + x^2)q = z(x^2 + y^2)$.
6. $(y + zx)p - (x + yz)q = x^2 - y^2$.

Assignment-1

1. Form a partial differential equation by eliminating arbitrary constants 'c' and 'α' from the equation $x^2 + y^2 = (z - c)^2 \tan^2 \alpha$. (3 marks)
2. Form a partial differential equation by eliminating arbitrary functions 'f' and 'g' from the equation $z = f(x^2 - y) + g(x^2 + y)$. (3 marks)
3. Obtain the general solution of $(x + 2z)p + (4zx - y)q = (2x^2 + y)$. (4 marks)

Note: Submit assignment to the respective course leader on or before 31^{st} January 2020.