Differential Equations and Transforms – BMAT102L

Solving Partial Differential Equations

Lagrange's linear Equation.

Tutorial problems

Grouping

1. Solve $ptanx + qtany = tanz$
2. Solve $p\sqrt{x} + q\sqrt{y} = \sqrt{z}$
3. Solve $(y + z)p + (z + x)q = x + y$
4. Solve $xy^2p + y^3q = zxy^2 - 4x^3$
5. Solve $z(z^2 + xy)(px - qy) = x^4$

Grouping and Multipliers

6. Solve $(y + zx)p - (x + yz)q = x^2 - y^2$
7. Solve $(z^2 - 2yz - y^2)p + (xy + zx)q = xy - zx$
8. Solve $\frac{y-z}{yz}p + \frac{z-x}{zx}q = \frac{x-y}{xy}$
9. Solve $x(y^2 - z^2)p + y(z^2 - x^2)q = z(x^2 - y^2)$
10. Solve $px(z - 2y^2) = (z - qy)(z - y^2 - 2x^3)$

Answers:

1. $f\left(\frac{sinx}{siny}, \frac{siny}{sinz}\right) = 0$
2. $f\left(\sqrt{x} - \sqrt{y}, \sqrt{y} - \sqrt{z}\right) = 0$
3. $f\left((x - y)^2(x + y + z),\ \frac{x-y}{x-z}\right) = 0$
4. $f\left(\frac{y}{x}, z - \frac{4x^2}{y^2}\right) = 0$
5. $f\left(\frac{y}{x}, \frac{x^2+y^2+z^2}{x}\right) = 0$
6. $f(xy, x^4 - y^4 - 2xyz^2) = 0$
7. $f(x^2 + y^2 + z^2, z^2 + 2yz - y^2) = 0$
8. $f\left(\frac{y}{z}, \frac{y^2}{x} - \frac{z}{x} - x^2\right) = 0$
9. $f\left(x^2 + y^2 + z^2, \frac{y}{z}\right) = 0$
10. $f(x^2 + y^2 + z^2, xyz) = 0$