Assignment 3
(PDE)

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Classify and solve the following PDES :—

1. $x(y^2+z)p - y(x^2+z)q = z(x^2-y^2)$

[Ans: $\phi(x^2+y^2-2z, xyz) = 0$]

2. $(y^3x - 2x^4)p + (2y^4 - x^3y)q = 9z(x^3-y^3)$

[Ans: $\phi(xyz^{1/3}, y/x^2 + x/y^2) = 0$]

3. $a(p+q) = z$

[Ans: $\phi(x-y, y-az) = 0$]

4. $(x^2+2y^2)p - xyq = xz$

[Ans: $\phi(yz, y^2x^2 + y^4) = 0$]

5. $(2x^2+y^2+z^2-2yz-2x-xy)p$
$+ (x^2+2y^2+z^2-yz-2zx-xy)q = x^2+y^2+2z^2-yz-2x-2y$

[Ans: $\phi\left(\frac{x-y}{y-z}, \frac{y-z}{z-x}\right) = 0$]

6. Find the integral surface of $x^2p + y^2q + z^2 = 0$ which passes through $xy = x+y$, $z=1$.

[Ans: $yz + 2xy + xz = 3xyz$]

7. Find the integral surface of $(x-y)y^2p + (y-x)x^2q = (x^2+y^2)z$ passing through $xz = a^3$, $y=0$.

[Ans: $z^3(x^3+y^3)^2 = a^9(x-y)^3$]

**** The End ****