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Problems under methods of Multipliers.

1. Solve (mz-ny)p+ (nx-1z)q = ly-mx

1 11 10 PDE is a Lagrange's with.

p=mz-ny, Q=nx-1z, R=1y-mx

subsidiary equation are

$$\frac{dx}{mz-ny} = \frac{dy}{nx-1z} = \frac{dz}{y-mx} = 0$$



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(218- NC) HH

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(Des-he) x +

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using the multipliers (oc, y, z), each of the ratio is of is equal to.

= amz - achy + ynoc - lyz + yzl xdx +ydy+zdz DE(mz-ny) + y(nx-1x) + 2(ky-mox)

31 - W = scdsc+ydy+zdz

(1) or zavinadoc tydy + zdz 20 william with private

Integrating, we get.

 $\frac{\infty^{2}}{2} + \frac{y^{2}}{2} + \frac{z^{2} + z^{2} + z^{2}}{2} = \frac{c_{1}}{2} + y^{2} - z^{2}$ (schools + (y) + x8

22+y2+z2=C,

Using the multipliers (l, m, n), each of the ratio is (is equal to

ldx +mdy+ndz = ldx +mdy +ndz l(mz-ny)+m(nx-1x) = lmx-nly +mnx -lmz +n(ly-mx) + nly -mnx

St= ldoc+mdy+ndz Sharling+ sch

: ldoc +mdigtndz = 0

Integrating, we get,

Loc + my +nz = C2

V = loc+my+nz sbs+pop+ soboe. The general solution of the given equation is of (u,v) ? f (x2+y2+z2, loc +my+nz) =0

50 - 4x + 4 + 4x

"5 +"U+" = X

et so with het xc) e of civials



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Education + report

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2. Solve (3x-4y) \frac{3x}{3x} + (4x-2x) \frac{3z}{3y} = 2y-3x. of 100

The given PDE is a Lagrange's linear equation with.

P=37-Ay, Q=4x-2z, R=2y-3x

The subsidiary equation are doc = dy - dz

Using the multipliers (2,3,4) each of the ratios in 1) is equal to.

2dx + 3dy + 4dz 2(3x-4y) + 3(4x-2z) + 4(2y-3x) = 2dx + 3dy + 4dz = 2dx + 3dy + 4dz

Integrating, we get . des . (in mil) wintfelmen with paid

20c+3y+42 =C,

u = 25c+3y+4z

(1) is equal to

xd>c+ydy+xdz x(3z-4y)+y(4x-2z) 3>cz-4xy+4xy-2yx, +x(2y-3>c) +xyx-3xz

ntegrating, we got zoty zotz = xdx +ydy +zdz

: scalac +ydy+zdz =0. 60 hoch

I ntegrating, we get up avip set to mindulas source

2 + 42 + 21 + 10 + 30 , (5+4+30) +

 $2^{2} + y^{2} + z^{2} = C_{2}^{2}$

V = x2+y2+22.

f(U,N)=0 f (2x+3y+4z, x2+y3+z2)=0



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3. Solve; x(y-2) p + y(z-2) y = z(x-y), 102 James 1

The given PDE is a Lagrange's linear equation with $P = \infty(y-z)$, $Q = y(z-\infty)$, R = z(x-y).

The subsidiary equation are $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

 $\frac{dx}{x(y-z)} = \frac{dy}{y(z-x)} = \frac{dz}{x(x-y)} - 0$

Using the multipliers (1,1,1) each of the sation is 1) is equal to

 $\frac{dx+dy+dz}{x(y-z)+y(z-x)+z(x-y)} = \frac{dx+dy+dz}{xy-xz+yz-xy+xz-zy}$ $= \frac{dx+dy+dz}{-2xy+xz-zy}$

 $\therefore dx + dy + dz = 0$

Integrating we get

x+y+z=c,

u= oc+ 4+2.

(1) is equal to

 $\frac{1}{2} dx + \frac{1}{2} dy + \frac{1}{2} dz$ $\frac{1}{2} x(y-z) + \frac{1}{2} y(x-\infty) + \frac{1}{2} z = \frac{1}{2} dx + \frac{1}{2} dy + \frac{1}{2} dz$ $= \frac{1}{2} dx + \frac{1}{2} dy + \frac{1}{2} dz$ $= \frac{1}{2} dx + \frac{1}{2} dy + \frac{1}{2} dz$

.. \frac{1}{20} dx + \frac{1}{4} dy + \frac{1}{2} dz = 0

I retegrating, we get.

 $\log x + \log y + \log x = \log c_2$ $\log (2cyx) = \log c_2$ V = 2cyz