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Type-III Standard type:.

1. Solve z= pq.

Sol

Given z = pq - 0,

The given PDE is of the form f(z, P.9)=0

(1) To find the complete integral

put u = x + ay

 $P = \frac{dz}{du}$; $q = a \frac{dz}{du}$.

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 $z^2 = (\frac{dz}{dt})^2 (1 + c^2)$

= 1+ (3) + 6 (32) +1=

(1) to find the complete integral

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Sub the values of p and q in O, we get.

$$\frac{dz}{du}$$
 a $\frac{dz}{du} = z$.

$$a\left(\frac{dz}{du}\right)^2 = z$$

$$\left(\frac{dz}{du}\right)^2 = \frac{z}{a}$$

$$\frac{dz}{du} = \frac{\sqrt{z}}{\sqrt{a}}$$

Integrating, we get.

$$\frac{Z^{2}}{2} = \frac{u}{\sqrt{a}} + b$$

(ii) To find the singular intigral Diff @ partially w. v to b, we get.

0=1 (which is about)

There is no singular integral

(ii) To find the general integral

Put b = f(a) in @, we get

Eliminate a btw 3 and 1 we get the general Trene is no singular adequal integral

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Sol an z= 1+p3-9 - 0 This is of the type f(z,P,q)=0

(i) to find the complete integral

Let u- x+ay

 $P = \frac{dz}{du}$ $q = a \frac{dz}{du}$.

Substituting the values of p and q in 1. we get

$$z^2 = 1 + \left(\frac{dz}{du}\right)^2 + \left(a\frac{dz}{du}\right)^2$$

$$z^2 = 1 + \left(\frac{dz}{du}\right)^2 + a^2 \left(\frac{dz}{du}\right)^2.$$

$$z^{2}-1 = \left(\frac{dz}{du}\right)^{2} (1+a^{2}).$$

$$\left(\frac{dz}{du}\right)^2 = \frac{z^2-1}{1+a^2}$$

$$\frac{dz}{du} = \frac{\sqrt{z^2-1}}{\sqrt{1+\alpha^2}}$$

$$\frac{dz}{\sqrt{z^2-1}} = \frac{du}{\sqrt{1+a^2}}$$

Integrating, we get.

$$\cosh^{-1}z = \frac{u}{\sqrt{1+a^2}} + b$$

which is the required complete integral

Dist @ partially wir to b, we get

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(ii) To find the general integral

$$\cosh^{-1}x = \frac{\infty + ay}{\sqrt{1 + a^2}} + f(a) - 3$$

$$\frac{\partial z}{\partial a} = 0$$
. (4)

Eliminate a beto 3 and 1 , we get the general integral

Lagrange's Whear PDE.

1. Solve op +yq =z

Soln

Griven septyq=z.

The given PDE is a lagrange's linear equation wit

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The subsidiary equations are doc dy dz

Taking the 1st two vatios, we get.

Integrating we get:

X X

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Find the general integral part of the general integral
$$\frac{\partial z}{\partial a} = 0$$
. $\frac{\partial z}{\partial a} = 0$. $\frac{\partial z}{\partial a} =$