

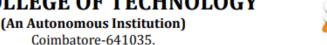


UNIT-III PARTIAL DIFFERENTIAL EQUATIONS

Lagrange's Linear Equation

Lagrange's Laneau Equation: The equation is of the form PP+Q9=R, where P, Q and R are functions of x, y, z. Thes is known as lagrange's linear egn. To solve thes equation, It is enough to Solve the subsidery (09) aurallowy equation  $\frac{dx}{p} = \frac{dy}{p} = \frac{dx}{p}$ the auxillacey egn can be solved a two ways. i). Method of grouping ii) method of multipliers. method of grouping: In the auxillary eqn.,  $\frac{dx}{p} = \frac{dy}{Q} = \frac{dx^3}{R}$ If the variables can be separated In any pair of equal, then we get a solution & of the form u(x, y) = c, and  $v(x, y) = c_2$ ie,  $\phi(u, V) = 0$  where  $\phi$  is authétainary. J. Solve  $Px^2 + qy^2 = x^2$   $80|\underline{n}:$   $px^2 + qy^2 = x^2$ These eggs is of the form P++ Qq = R where P=22, B=y2 and  $R = 7^2$ 







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The auxiliancy eqn (a)
$$\frac{dx}{P} = \frac{dy}{ex} = \frac{dz}{R}$$

$$\frac{dx}{P} = \frac{dy}{ex} = \frac{dz}{R}$$

$$\frac{dx}{R^2} = \frac{dy}{y^2} = \frac{dz}{Z^2}$$

Take 
$$\frac{dx}{x^2} = \frac{dy}{y^2}$$

$$\frac{dy}{y^2} = \frac{dz}{Z^2}$$

Integrating, we get
$$\int x^{-2} dx = \int y^{-2} dy$$

$$\int y^{-2} dy = \int x^{-2} dz$$

$$\frac{x^{-1}}{-1} = \frac{y^{-1}}{-1} + C_1$$

$$\frac{-1}{2} + \frac{1}{y} = C_1$$

$$\frac{-1}{2} + \frac{1}{y} = C_1$$

$$\frac{-1}{2} + \frac{1}{y} = C_2$$

$$\frac{-1}{2} + \frac{1}{2} = C_2$$

$$\frac{-1}{2} + \frac{$$



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$$\frac{dx}{y^{R}x} = \frac{dy}{x^{R}}$$

$$\frac{x dx}{y^{R}x} = \frac{dy}{x^{R}}$$

$$\frac{x^{R}dx}{y^{R}x} = \frac{dy}{x^{R}}$$

$$\frac{x^{R}dx}{y^{R}x} = \frac{dx}{y^{R}}$$

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$$\frac{x^{R}dx}{x^{R}x} = \frac{x^{R}dx}$$

$$\frac{x^$$





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Fig. Solve 
$$P + \alpha nx + q + \alpha ny = \tan x$$

Solve  $P + \alpha q = R \Rightarrow P = \tan x$ ,  $\alpha = \tan y$ ,  $R = \tan x$ 

$$\frac{AE}{AE} = \frac{dx}{\tan x} = \frac{dy}{\tan y} = \frac{dx}{\tan x}$$

$$\frac{dx}{\tan x} = \frac{dy}{\tan y} = \frac{dx}{\tan x}$$

$$\frac{dy}{\tan x} = \frac{dy}{\tan y} = \frac{dx}{\tan x}$$

$$\frac{dy}{\tan y} = \frac{dx}{\tan x}$$

$$\int \cot x \, dx = \int \cot y \, dy$$

$$\log(sqnx) = \log(sqny) + \log(sqny) = \log(sqny) - \log(sqnx) = \log(sqny) - \log(sqnx) = \log(sqny) - \log(sqnx) = \log(sqny) - \log(sqny) - \log(sqny) - \log(sqny) = \log(sqny) - \log(sqny) - \log(sqny) = \log(sqny) + \log(sqny) = \log(sqny) - \log(sqny) = \log(sqny) + \log(sqny) = \log(sqny) + \log(sqny) = \log(sqny) - \log(sqny) = \log(sqny) + \log(sqny) = \log(sqny) + \log(sqny) = \log(sqny) =$$





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$$\frac{\Delta E}{\sqrt{x}} = \frac{dx}{\sqrt{y}} = \frac{dx}{\sqrt{z}}$$

$$\int \frac{dx}{\sqrt{x}} = \int \frac{dy}{\sqrt{y}} = \int \frac{dz}{\sqrt{z}}$$

$$2\sqrt{x} = 2\sqrt{y} + 2c_1$$

$$\sqrt{x} = \sqrt{y} + c_1$$

$$\sqrt{x} = \sqrt{y} + c_1$$

$$\sqrt{y} = \sqrt{x} + 2c_2$$

$$\sqrt{y} = \sqrt{x} + 2c_2$$

$$\sqrt{y} = \sqrt{x} + c_2$$

$$\sqrt{y} =$$