2.28 (n)

1 2.28 (n), §1 Asked

Given:

$$\sin^2(x)u_{xx} + 2\cos(x)u_{xy} - u_{yy} = 0$$

Asked: Reduce it to 2D canonical form.

2 2.28 (n), §2 Solution

$$\sin^2(x)u_{xx} + 2\cos(x)u_{xy} - u_{yy} = 0$$

$$\frac{\mathrm{d}y}{\mathrm{d}x} = \frac{b \pm \sqrt{b^2 - ac}}{a} = \frac{\cos(x) \pm 1}{\sin^2(x)}$$

$$y = -\frac{1}{\sin(x)} \pm \operatorname{cotg}(x) + C$$

$$\xi = y + \frac{1}{\sin(x)} + \operatorname{cotg}(x) \quad \eta = y + \frac{1}{\sin(x)} - \operatorname{cotg}(x)$$