

2.28 (m)

1 2.28 (m), §1 Asked

Given:

$$xu_{xx} + 2\sqrt{xy}u_{xy} + yu_{yy} - u_y = 0$$

Asked: Reduce it to 2D canonical form.

2 2.28 (m), §2 Solution

$$xu_{xx} + 2\sqrt{xy}u_{xy} + yu_{yy} - u_y = 0$$

$$\frac{dy}{dx} = \frac{b \pm \sqrt{b^2 - ac}}{a} = \sqrt{\frac{y}{x}}$$

Parabolic.

$$\frac{dy}{\sqrt{y}} = \frac{dx}{\sqrt{x}} \implies \sqrt{y} = \sqrt{x} + C$$

$$\xi = x \quad \eta = \sqrt{y} - \sqrt{x}$$