

Vector Fields
Scalar and Vector Fields

Question

Sketch the following plane vector field and determine its field lines.

$$\underline{F}(x, y) = e^x \underline{i} + e^{-x} \underline{j}$$

Answer

The field lines satisfy $\frac{dx}{e^x} = \frac{dy}{e^{-x}}$

Thus $\frac{dy}{dx} = e^{-2x}$.

The field lines are the curves

$$y = -\frac{1}{2}e^{-2x} + C.$$

