Vector Fields
Scalar and Vector Fields

Question

Describe the streamlines of the following velocity field.

$\underline{v}(x, y) = x^2 \underline{i} - y \underline{j}$

Answer

The field lines satisfy $\frac{dx}{x^2} = -\frac{dy}{y}$.

So they are given by $\ln |y| = \frac{1}{x} + \ln |C|$, or equivalently, $y = Ce^{1/2}$.