

Exercise 19

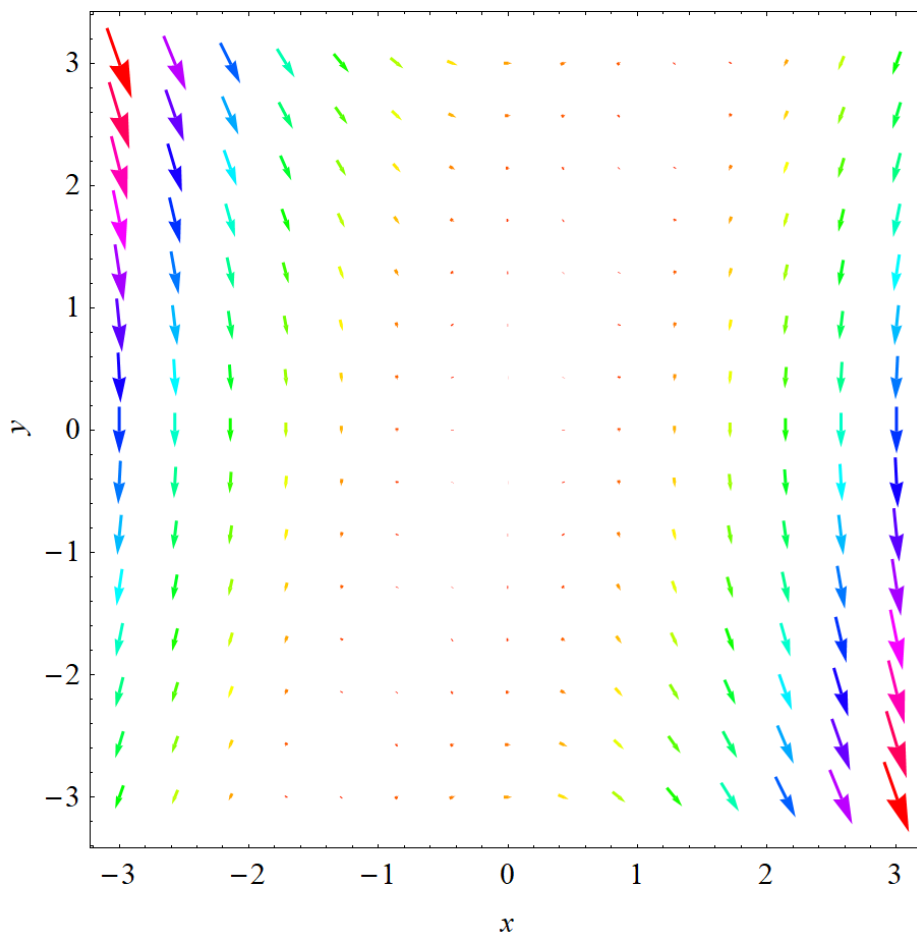
If you have a CAS that plots vector fields (the command is `fieldplot` in Maple and `PlotVectorField` or `VectorPlot` in Mathematica), use it to plot

$$\mathbf{F}(x, y) = (y^2 - 2xy) \mathbf{i} + (3xy - 6x^2) \mathbf{j}$$

Explain the appearance by finding the set of points (x, y) such that $\mathbf{F}(x, y) = \mathbf{0}$.

Solution

Using `VectorPlot` in Mathematica gives the following picture.



Factor the given vector function.

$$\mathbf{F}(x, y) = y(y - 2x) \mathbf{i} + 3x(y - 2x) \mathbf{j}$$

$\mathbf{F}(x, y) = \mathbf{0}$ along the line $y = 2x$.