MATH 302

CHAPTER 1

SECTION 1.3: DIRECTION FIELDS FOR FIRST ORDER EQUATIONS

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WHAT IS A DIRECTION FIELD?

Consider the following first order ODE:

$$y'(x) = f(x, y(x)).$$

If you use this information well, you can get these pictures.

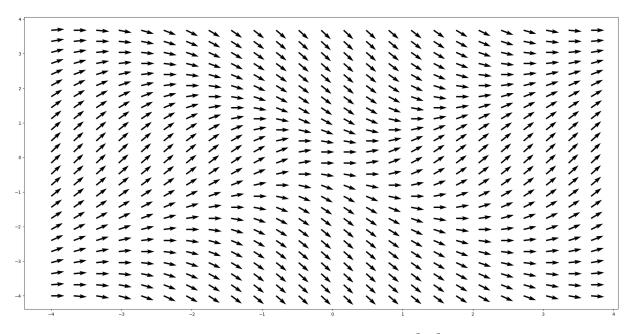


Figure 1: Direction field of $y' = \frac{x^2 - y^2}{1 + x^2 + y^2}$.

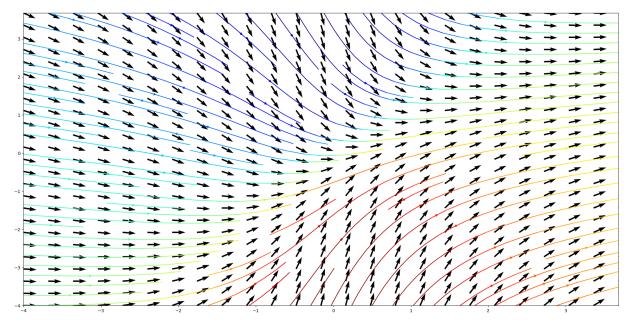


Figure 2: Direction field of $y' = \frac{x-y}{1+x^2}$.

Example 1.	Draw th	e direction	field	of the	following	ODE
DAAMPLE I.	Diaw u	ie unection	neiu	or me	10110W111g	ODE.

$$y' = 1 + xy^2.$$

1. Create a rectangular grid.

2. Find the slopes in each points of the grid (nods).

3. Draw the actual direction field.