



MISSOURI

S&T

MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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Section 1.3

Direction Fields

Direction Fields

Consider an ODE of the form

$$\frac{dy}{dx} = f(x, y)$$

This equation tells us that the rate of change (slope) of the unknown function y at the point (x, y) is $f(x, y)$.
 $f(x, y)$ is often called a slope function or rate function.
We can generate a direction field (or slope field) by plotting the slope $f(x, y)$ at a selection of points (x, y) .

Example 1

Sketch a direction field for the differential equation

$$\frac{dy}{dt} = y^2 - 1$$

Then, sketch the solution curve with initial value

$$y(0) = -\frac{1}{4}$$

y	Slope function $f = y^2 - 1$
-2	
-1.5	
-1	
-0.5	
0	
0.5	
1	
1.5	
2	

Example 2

Sketch a direction field for the
differential equation

$$\frac{dy}{dt} = y^2 - t$$

with initial condition
 $y(0) = -1$
