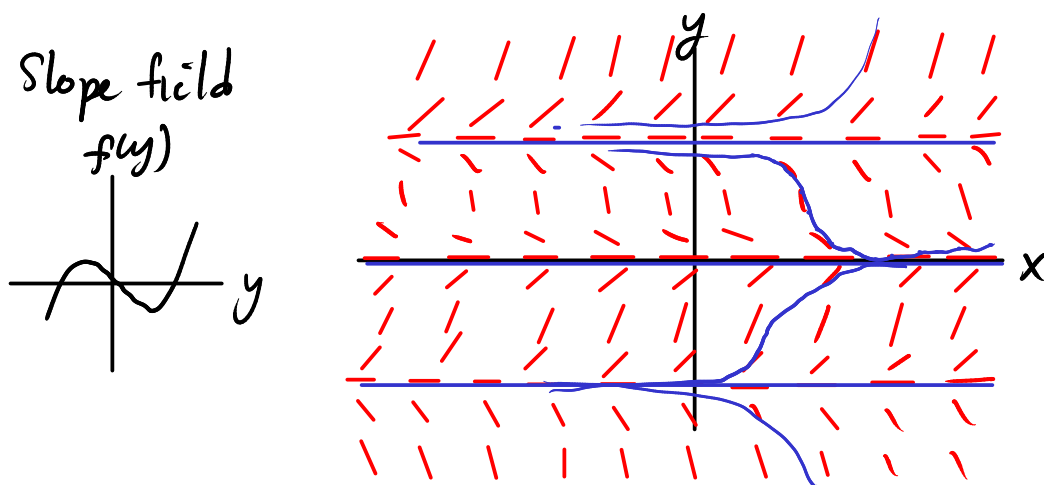


Example $\frac{dy}{dx} = y^3 - y = y(y+1)(y-1)$



y values for which $f(y) = 0$ are called equilibrium points.

Each equilibrium point corresponds to a constant solution.

An equilibrium is called stable if nearby solutions converge to it.

In example, $y = 0$ is stable equilibrium
 $y = 1$ and $y = -1$ are unstable.

Existence and uniqueness of solutions.

In most of this course, we won't have to worry about this, but for general differential equations things can go wrong?

1. Failure of existence $\frac{dy}{dx} = \frac{1}{x} \Rightarrow y = \ln|x| + C$

No solution curve satisfying $y(0) = a$,
 or even with $y(0)$ defined!