

Non-Linear Systems

It turns out that most systems of differential equations are not linear.

Autonomous Non-Linear Systems

In order to approach these systems, we want to analyze autonomous non-linear systems.

Autonomous Equations to Systems

How did we handle autonomous first order equations? Can we extend that to autonomous first order systems?

Equilibrium Solutions

The first step in this process is to find the equilibrium solutions to our system.

Example. Find all equilibrium solutions of the system

$$\begin{aligned}\frac{dx}{dt} &= (x - 2)(y - 4) \\ \frac{dy}{dt} &= (x - y)(y + 3)\end{aligned}$$