

## Nullclines and Analysis

Another way that we can analyze these systems is via the nullclines.

Nullcline - A line or curve along which at least one of the derivatives is zero.

- Intersection of nullclines from opposite derivatives give equilibrium solutions.
- At a nullcline solution moves either horizontal or vertical.
- Between them, get the general direction that the solution moves.

**Example.** Find the null-clines of the system below. How does this give us the same result as the previous example?

$$\frac{dx}{dt} = x(3 - x - y)$$

$$\frac{dy}{dt} = y(3 - 2y - 0.5x)$$

Competing  
Species

$$x=0$$

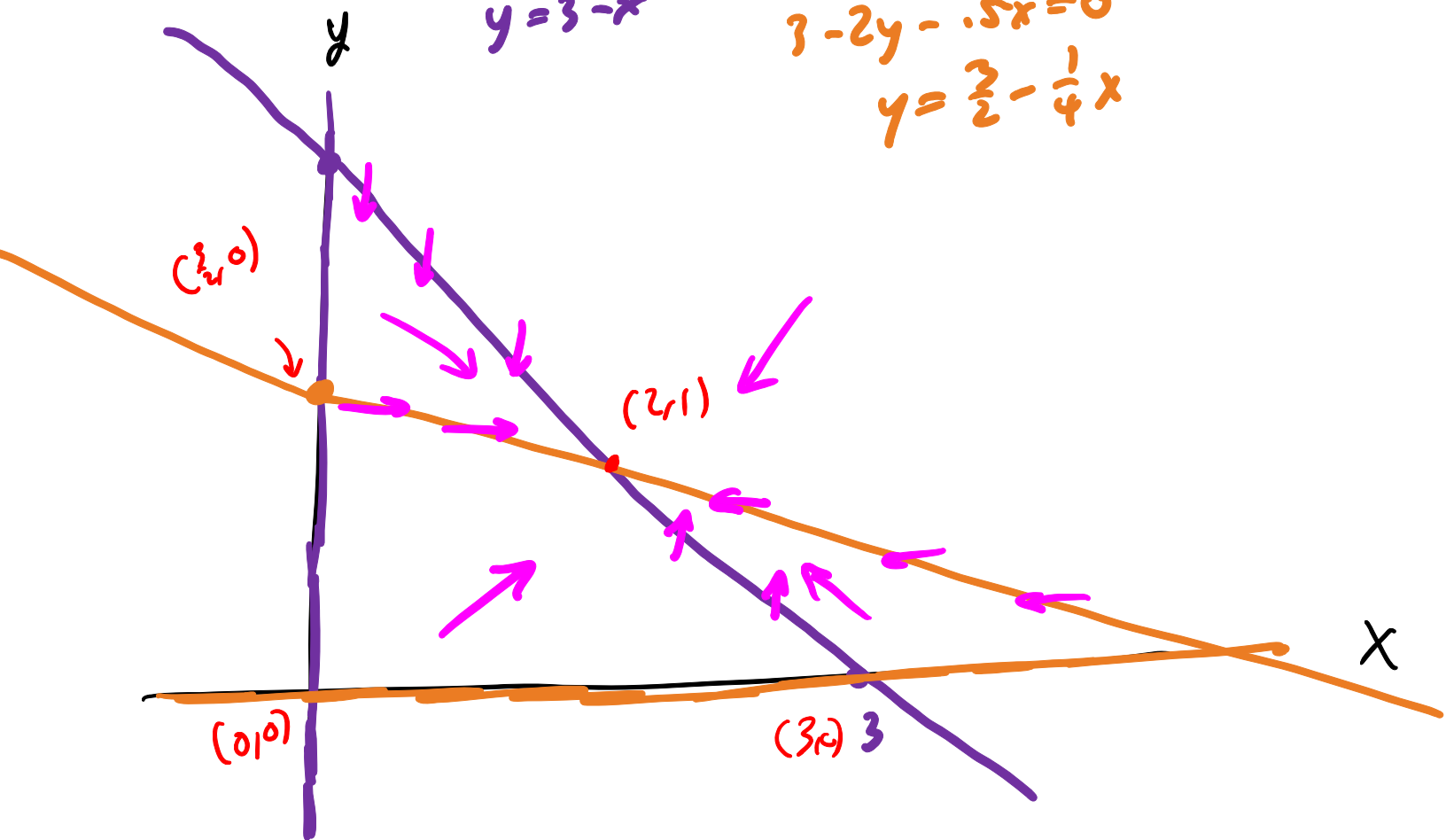
$$3 - x - y = 0$$

$$y = 3 - x$$

$$y=0$$

$$3 - 2y - .5x = 0$$

$$y = \frac{3}{2} - \frac{1}{4}x$$



• Nodal Sink seems to fit with this analysis as well.