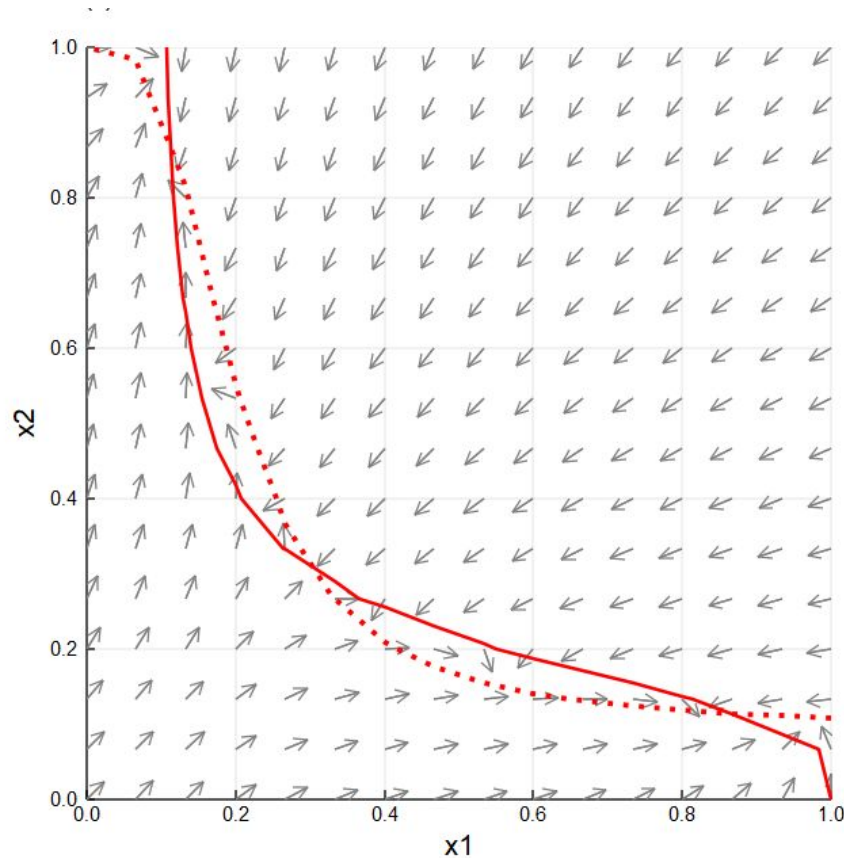


Question 1 Part b:



Based on your phase portrait, show that in the long-time limit, the system will settle into a steady state in which one cell assumes the primary fate while the other cell assumes the secondary fate.

The system shows three steady-states where the nullclines cross. Two of the steady-states ($D_1 \approx 0.9$, $D_2 \approx 0.1$ and $D_1 \approx 0.1$, $D_2 \approx 0.9$) are stable. These steady state values are close to 0 and 1, meaning that one cell will take on the primary fate and the other will take on the secondary fate, rather than stability at a mix of Notch and Delta (the middle steady state, which is a mix of fates, is unstable).

Discuss whether lateral inhibition works similarly as the case discussed in lecture (i.e. limit in which the decay rate of Delta is much greater than that of Notch).

The basic mechanism of lateral inhibition works the same in both limits. The nullclines take on different shapes, but the stable steady states are similar in both limits. In both cases, one cell assumes a primary fate, and the other the secondary fate