***Introduction to Theoretical Ecology Assignment 8***

Lotka-Volterra Predator-Prey Model with Logistic Prey Growth

The basic Lotka-Volterra predator-prey model assumes an exponential prey growth. A modification of the original model is to include density-dependent logistic prey growth:

, where *r* is the intrinsic growth rate of prey, *K* is the carrying capacity of prey, *a* is the capture rate of predator, *e* is the conversion efficiency, and *δ* is the mortality rate of predator.

1. Find the equilibrium points of the system.

The equilibrium points (N\*, P\*) are (0, 0), (*K*, 0) and ()

1. Perform local stability analysis for the internal equilibrium.

* The Jacobian evaluated at the internal equilibrium:
* The eigenvalues:

1. Simulate the system for 100 time steps and visualize the population trajectories of prey and predator (you can use any parameters of your choice).