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Biocomputing modeling project

Stability of Predator-Prey Dynamics

Lotka-Volterra

The growth of herbivores is proportional to the size of the herbivore population. The proportionality constant for this growth is b. show plots…

Larger b, quicker growth and regeneration

The parameter ‘a’ shows up in two places of the equations. The negative change of the herbivore population is proportional to the product of the size of the herbivore and predator population with the proportionality constant ‘a’. Likewise, the growth of the predator population is proportional to the product of the herbivore and predator populations with the the constants ‘a’ and ‘e’. The function of a is therefore that it modulates how strong the predator-prey interaction is. A large ‘a’ means that the predators are very effective at finding and eating the pray. Show plots

Result, when a becomes large we see a steep decrease in herbivores and a sharp increase in predators.

The constant e shows up as a factor in the predator growth term. The function of e is to modulate how fast the predators will multiply in numbers in response to eating prey.

The parameter s only shows up in the negative growth term for P. The term indicates that the predators die at a rate the is proportional the size of the predator population. So the effect of s is analogous to the lifetime of the predators. Large s equates to a short lifetime of the predators