

Problem 6.1

Stability analyses can help us in trying to understand or predict the longterm dynamics of a system. Stability is probably more applicable to some systems than others; systems in which disturbance is very common may be less predictable.

Problem 6.3

In the predator-prey situation, if species 1 is the predator and species 2 is the prey, the sign of $\frac{df1}{dN2}$ will be positive and the sign of $\frac{df2}{dN1}$ will be negative. For competition, the signs of both $\frac{df1}{dN2}$ and $\frac{df2}{dN1}$ will be negative. For mutualism, both signs will be positive.

Problem 2

In chapter six α_{ij} is equal to the change in per capita growth rate of species i as the number of individuals of species j is changed.

In chapter seven, α_{ij} is equal to the relative effect that species j has on the growth rate of species i, compared to the effect of species i on itself. A major difference is that in chapter seven, this variable represents a relative rate, whereas in chapter six the variable does not incorporate information about a species' effect on itself.

Instead of this notation being used in both cases, the book could use a_{ij} in chapter six.

Problem 3

Increasing the value of p increases the number of individuals moving from New York to California. This initially decreases the population of New York (if p is larger than q), but after a couple of rounds of migration, the number of individuals in the populations of both states remains constant.

Problem 4

<https://docs.google.com/document/d/1ytCgX316E1UQNMLyLLD5NwJLcckl1ynfibFNNUUSVJc/edit>