

## 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  $\frac{df_1}{dN_2}$  will be positive and the sign of  $\frac{df_2}{dN_1}$  will be negative. For competition, the signs of both  $\frac{df_1}{dN_2}$  and  $\frac{df_2}{dN_1}$  will be negative. For mutualism, both signs will be positive.

## Problem 2

In chapter six  $\alpha_{ij}$  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,  $\alpha_{ij}$  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

[Available here](#)