Chapter 4: Solution to Problem 9

9. $$\frac{1}{\sum \frac{c_i}{w_{22i}}} < 1 < \sum c_i w_{22.i}$$

$$\frac{1}{\sum \frac{c_i}{w_{22.i}}} < 1$$

$$\frac{1}{\frac{c_1}{0.8} + \frac{1-c_1}{1.2}} < 1$$

$$1 < \frac{c_1}{0.8} + \frac{1-c_1}{1.2}$$

$$1 < \frac{c_1(1.2)+(1-c_1)(0.8)}{(0.8)(1.2)}$$

$$1 < \frac{c_1(1.2)+0.8-c_1(0.8)}{0.96}$$

$$0.96 < 0.4c_1 + 0.8$$

$$0.16 < 0.4c_1$$

$$0.4 < c_1$$

$$1 < \sum c_i w_{22.i}$$

$$1 < 0.8c_1 + 1.2(1 - c_1)$$

$$1 < 0.8c_1 + 1.2 - 1.2c_1$$

$$1 < 1.2 - 0.4c_1$$

$$0.4c_1 < 0.2$$

$$c_1 < 0.5$$

$$0.4 < c_1 < 0.5$$

Disregard second portion of the problem (graphing the equilibrium frequency).