Mathematics 172

Quiz #14 Name: Key

You must show your work to get full credit.

For the Leslie matrix

$$L = \begin{bmatrix} 0 & 2.0 & 3.0 \\ .9 & 0 & 0 \\ 0 & .3 & 0 \end{bmatrix}$$

and initial condition

$$\mathbf{N}_0 = \begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix}$$

answer the following:

(1) What is the intial number of one, two and three year olds?

Nunber of one year olds. 10

Nunber of two olds. 20

Nunber of three olds. 30

(2) What is the per capita birth rate of three year olds? 3.0

(3) What is the survival rate of two year olds? .3

(4) What is $\mathbf{N}_1$?

$$N_1 = LN_0 = \begin{bmatrix} 0 & 2 & 3 \\ .9 & 0 & 0 \\ 0 & .3 & 0 \end{bmatrix} \begin{bmatrix} 10 \\ 20 \\ 30 \end{bmatrix}$$

$$= \begin{bmatrix} 0+2\cdot 20+3\cdot 30 \\ (.9)10 \\ (.3)(20) \end{bmatrix} = \begin{bmatrix} 130 \\ 9 \\ 6 \end{bmatrix}$$

$\mathbf{N}_1 =$ $\begin{bmatrix} 130 \\ 9 \\ 6 \end{bmatrix}$