

Assignment 1: A Single Species Model

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January 7, 2003

Consider the evolution of the population of a species of birds. Because the number of males and females are nearly equal, we count only females. We assume that each female remains a juvenile for one year and then becomes an adult, and that only adults have offspring. We make three assumptions about reproduction and survival rates:

1) the number of juvenile females hatched in any year is on average twice the number of adult females alive the year before (we say the **reproduction rate** is 2);

2) half of the adult females in any year survive to the next year (the **adult survival rate** is $1/2$);

3) $1/8$ of the juvenile females in any year survive into adulthood (the **juvenile survival rate** is $1/8$).

Using Maple, compute the population of females k years later, if there were 100 adult females and 40 juvenile females alive initially. Show that the population becomes extinct.

Value of this assignment is 4 points (1 point is equal to 1 percent of your final mark).