

## DIFFERENCE EQUATIONS AND MARKOV CHAINS HOMEWORK

MATH 308

**Exercise 1.** Suppose that I open a golf driving range. I have 700 golf balls which are either in the club house or out on the grass. On a typical day half of the balls from the club house are hit onto the grass, and the other half stay there. Of the balls in the grass, 90% are collected and returned to the club house, and 10% stay on the grass. On the first day, all 700 of the balls are in the club house.

Set up a transition matrix that describes this situation. Find the eigenvalues and eigenvectors. Write equations that tell me how many balls are in each location at the end of  $k$  days. What is the limit as  $k \rightarrow \infty$ ?