MAT 22B Group Work 4 (Due 7/16 11:59 PM)

The goal of this assignment is to create a cobwebbing diagram and bifurcation diagram for the logistic difference equation

$$u_{n+1} = \rho u_n \left(1 - u_n\right).$$

We will explore different parameter values of ρ.

1. Create a cobwebbing diagram for the logistic difference equation for the following values of ρ. Use at least $n+1$ initial conditions where n is the number of equilibrium solutions.

   (a) $\rho = 0.8$
   (b) $\rho = 1.5$
   (c) $\rho = 2.8$
   (d) $\rho = 3.2$
   (e) $\rho = 3.5$

2. What do you observe about the behavior of solutions for the different values of ρ?

3. Create a bifurcation diagram for $\rho \in [0, 4]$. A bifurcation diagram plots the parameter rho along the horizontal axis and the equilibrium solution along the vertical axis. Comment on what you observe in your bifucation diagram.