

MATH 311

REVISED PROJECT FOR MODULE 3 (CYCLES AND THEIR CLASSIFICATION)

This project involves the bifurcation diagram for the logistic family $g_c(x) = cx(1 - x)$. There's a zoomable applet at <http://brain.cc.kogakuin.ac.jp/~kanamaru/Chaos/e/BifArea/> (you can follow the link from the course website). I encourage you to read the Alligood/Sauer/Yorke text's discussion of the logistic family (section 1.5).

1. Explain what the bifurcation diagram is telling us about the dynamics of the logistic family.
2. Find values of the parameter c that lead to attracting 2-, 4-, 8-, 3-, and 6-cycles. Create cobweb plots displaying each of these cycles.
3. For each of the parameter values that you found in part (2), verify algebraically that the given cycle exists and is attracting. (HINT: Maple is your friend.)
4. Why do you think some regions of the bifurcation diagram are darker than others?