

Problem Set 1

Due *Wednesday, February 4.*

Text Exercises:

T1.11, T1.12, T1.13

Chapter 1 Exercises:

1.7, 1.14, 1.16

Additional Problem:

The map $f(x) = (3x - x^3)/2$ is discussed in Example 1.3. Then on page 12, the authors explain why the basins of the two sinks are “complicated”. Read this description carefully.

Now give a better description, with more details, and with a cobweb plot (or several plots) to explain what the basins look like.

Two hints: (1) As the text points out, the map has a period 2 orbit $\{\sqrt{5}, -\sqrt{5}\}$. Make an accurate plot of the graph of f on the interval $-\sqrt{5} \leq x \leq \sqrt{5}$. You can use Maple, or any other software. (2) Consider all the points that eventually land on the source at $x = 0$. These are the points that separate the basins of the two sinks. Use cobwebbing (possibly working backwards) to find these points.