

Assignment 5

Math 2413

October 6, 2008

1. Read bogus §10.1-2.
2. Look at the bogus problems 10.1.1,9,2,10,4,12,18,20,21-27; 10.2.5,10,16,17.
3. Read bogus §4.2
4. Look at the bogus problems 4.2.2,4,7,9-16,23-28.
5. Draw a “bifurcation diagram” for the equation $y'' + py' + qy = 0$ in p, q -space. This means, draw curves across which the qualitative properties of solutions change and label the resulting curves and regions.
6. Find a 2x2 constant coefficient linear system equivalent to the equation in the last problem. What restrictions are there on such a system (by virtue of the fact that it comes from a second order equation)?
7. Given any 2x2 constant coefficient system, can you change variables so that the resulting system is equivalent to a second order ODE?
8. Read bogus Chapter 7 (if necessary).
9. Vocabulary: Phase plane, systems of ODEs, sink, source, spiral, decay, exponential growth, orbits, linearization, isocline, nullcline, equilibrium, separatrix, quantitative, qualitative.