

Math 413, Fall 2010
Homework 2. Due Friday 09/24/10

Part I. Do the following problems from Holmes textbook: 1.12, 1.19, 1.24, p.37–41

Part II. Do the following problems from Holmes textbook: 2.1 (a-b), 2.3, 2.6. Please plot your results in comparison with numerical solutions provided by MATLAB.

Part III. Solve by perturbation

$$x^2 - 4 = \epsilon \ln(x)$$

Notice that, as $\epsilon \rightarrow 0$, this equation formally reduces to the equation $x^2 - 4 = 0$, with two roots $x_{1,2} = \pm 2$. Original equation also has two solutions (why?). How are they related to $x_{1,2} = \pm 2$? Can both solutions of the original equation be obtained by perturbation?