

Math 413, Fall 2010
Practice questions - Final Exam.

Part I. Holmes: Problems 1.2, 1.25, 2.8, 2.25, 2.28, 3.17, 3.18, 4.12, 4.17

Part II.

Q1. Use singular perturbation to find the leading order approximation to the solution to the following boundary value problem:

$$\begin{aligned}\epsilon y'' + 2y' + y^3 &= 0, 0 < t < 1, \\ y(0) &= 0, y(1) = \frac{1}{2}\end{aligned}$$

Q2. Use Fourier transform to obtain solution to the 2-dimensional Laplace equation BVP:

$$\begin{aligned}u_{xx} + u_{yy} &= 0, -\infty < x < \infty, y > 0 \\ u(x, 0) &= f(x), u \rightarrow 0, \text{ as } y \rightarrow \infty\end{aligned}$$