

University of Delaware
Department of Mathematical Sciences
Math 810 Asymptotic and Perturbation Methods 09S
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Homework 2: Due 3/4/09

1. Problem 1.4 of Hinch.
2. If you haven't already, Read Ch 1 of Hinch.
3. Find the two-term expansion approximating $y(x)$ for

$$y'' + y + \epsilon y^3 = 0, \quad 0 < \epsilon \ll 1, \quad y(0) = 0, \quad y(\pi/2) = 1.$$

4. Find the two-term expansion approximating $y(x)$ for

$$y'' + f(\epsilon y) = 0, \quad 0 < \epsilon \ll 1, \quad y(0) = y(1) = 0.$$

Assume that $f(s)$ is a smooth positive function.

5. Read Ch 1 of Kevorkian and Cole through Section 1.3.1.
6. Problem 1 (p. 33) of Kevorkian and Cole.

The middle two problems are exercises from Holmes, Section 1.6.

Some useful things to know for this homework: trig identities for powers of trig functions. This and Taylor expansions of all kinds of transcendental functions will be used a lot.