Asymptotic & Perturbation Methods in Applied Mathematics

ESAM 420-1

Fall 2002

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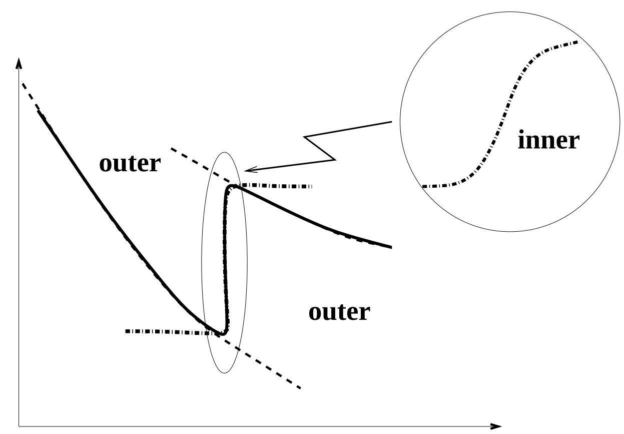
Most interesting problems in engineering and science cannot be solved exactly. Perturbation methods allow then often to obtain approximate solutions by neglecting small effects and focussing on the essential features of the problem. This reduction to the salient aspects often provides intuitive, physical insight into the problem, which serves to guide numerical computations of the full problem. Thus, perturbation and numerical methods complement each other.

In this class the main ideas of perturbation theory will be discussed using examples from various fields of engineering and science, e.g. mechanics, fluid mechanics, chemical reactions.



Key topics to be discussed in the first quarter (420-1) include

- Perturbation methods for algebraic equations
- Regular and singular perturbation problems
- Perturbation methods for differential equations
- Boundary and internal layers
- Matched asymptotic expansions
- Strained coordinates
- Weakly nonlinear systems

Location and Time: TuTh 3:30-4:50 A110

For more information call, send e-mail, or stop by: 491-8316; h-riecke@nwu.edu; M458.

Note: The continuation of this class (420-2,3) will be taught by Moshe Matalon.