Math 550 – Methods of asymptotic analysis

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Exact or numerical techniques are not the only way to solve problems or understand their solutions. This course describes the machinery of asymptotic analysis which can be applied to the solution of physical problems.

The syllabus:
I. Asymptotic series
II. Solution of algebraic systems
III. Integrals
IV. Differential equations
V. Matched asymptotics
VI. Multiple scales
VII. Improvement of series

Special emphasis will be given to applying the techniques to problems of physical relevance (.*e.g.* analysis of wave dispersion relations, amplitude expansions for forming patterns, dynamics of nonlinear oscillators, fluid boundary layers).

Assessment will involve coursework (homework problems) and examination.

Recommended texts:
    E. J. Hinch, "Perturbation Methods"
    C. Bender & S. Orszag, "Advanced mathematical methods for scientists and engineers"