

Asymptotics and Perturbation Methods

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1. Asymptotic expansions
2. Properties of asymptotic expansions
3. Integration by parts
4. Laplace's method
5. Stationary phase
6. Steepest descent
7. Saddle points
8. Integral representations and an introduction to dominant balance
9. Dominant balance
10. Perturbation methods for algebraic equations
11. Regular perturbation methods for ODEs
12. Introduction to boundary layer theory
13. Higher-order matching in boundary layer theory
14. Location and thickness of boundary layers
15. Corner layers
16. A tricky nonlinear boundary-value problem
17. An application to systems biology: the Michaelis-Menten model
18. Introduction to WKB theory
19. Turning points and Airy functions
20. WKB for eigenvalue problems
21. Delayed bifurcation
22. Introduction to the method of multiple scales
23. Two-timing

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