Outline of “Introduction to Applied Mathematics”

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Lect01 Introduction

Part I: Approximation of Integrals
Lect02 Laplace Asymtotics
Lect* Application in Shock Wave Dynamics
Lect03 Stationary Phase Approximation
Lect* Application in QM
Lect04 Method of Steepest Descents
Lect05 Infinite Series Summation

Part II: Local Approximation of ODEs
Lect06 Overview of ODEs
Lect07 Linear ODEs: Ordinary and Regular Singular Points
Lect08 Linear ODEs: Irregular Singular Points
Lect09 Asymptotic Series
Lect10 Nonlinear ODEs: I
Lect11 Nonlinear ODEs: II

Part III: Global Analysis
Lect12 Basic Perturbation Theory: I
Lect13 Basic Perturbation Theory: II
Lect14 Boundary Layer Theory: I
Lect15 Boundary Layer Theory: II
Lect* Application in Fluids
Lect16 WKB theory: I
Lect17 WKB theory: II
Lect* Application in Rare Event Study
Lect18 Multi-Scale Analysis: I
Lect19 Multi-Scale Analysis: II
Lect* Application in Homogenization

Lectures marked with * are optional.