

Outline of “Introduction to Applied Mathematics”

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Lect01 Introduction

Part I: Approximation of Integrals

Lect02 Laplace Asymptotics

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.*