



## Announcement

## Introduction to Asymptotic Methods

PD Dr. Maxim A. Efremov

### Content

The aim of this special lecture series is to provide students with a Bachelor or Master degree with advanced mathematical tools to solve different problems faced by physicists, engineers, and applied mathematicians. Each method is illustrated by both well-known and completely new examples of physics problems appeared within classical and quantum mechanics.

Methods include but are not limited to

- (i) approximate solutions of transcendental equations,
- (ii) asymptotic calculus for integrals and sums,
- (iii) the saddle-point and contour integration methods,
- (iv) the WKB method and its generalizations for differential equations of different types,
- (v) the methods of averaging.

### Literature

- Additional N.G. de Bruijn, *Asymptotic methods in analysis* (Dover, 2010)
- C.M. Bender and S.A. Orszag, *Advanced asymptotic methods for scientists and engineers: asymptotic methods and perturbation theory* (Springer, 1999)
- A.H. Nayfeh, *Perturbation methods* (Wiley, 2007)
- E.J. Hinch, *Perturbation methods* (Cambridge University Press, 1995)

### information

Lecture (5 hours per week)

### Assessment

Oral examination (6 CP)

### Lecturer

PD Dr. Maxim A. Efremov, Institut für Quantenphysik