EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN

Mathematisch-
Naturwissenschaftliche
Fakultät

Fachbereich Mathematik

AB Geometrische Analysis,
Differentialgeometrie und
Relativitätstheorie

Wintersemester 2017/18

Spectral Methods

Dozent: Dr. Leon Escobar
Beginn: Mittwoch, 18. Oktober 2017
Zeit: Mittwoch, 16–18 Uhr
Ort: N16

Beschreibung

Spectral methods are powerful mathematical techniques used for the solution of partial differential equations. Unlike the local approaches, as the finite difference methods or finite elements, spectral methods are global methods where the computation at any given point depends not only on information at neighboring points, but on information from the entire domain. A remarkable fact is that under suitable conditions, spectral methods converge exponentially, which makes them more accurate than local methods. In this course, we will give an introduction to this kind of methods laying special emphasis on their practical implementation to the solution of partial differential equations from the field of the mathematical physics.

Voraussetzungen

Basic knowledge on partial differential equations, numerical methods and some programming language, preferable MATLAB.

Literatur

L. N. Trefethen, *Spectral methods in MATLAB*, Society for Industrial and Applied Mathematics (2000).

J. S. Hesthaven, S. Gottlieb and D. Gottlied, *Spectral methods for time-dependent problems*, Cambridge University Press, vol. 21

Studien- und Prüfungsleistungen

There will be an individual assignment which will be worth half of the final mark. The other half will be determined by an oral exam.