The Simplex Functional and its applications to Multivariate Polynomial Interpolation

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Timetable: 16 hrs. CANCELLED

Course requirements: Functional analysis, complex analysis and numerical analysis.

Examination and grading: Seminar on a subject assigned by the teacher.

SSD: MAT/08 (Numerical Analysis) and MAT/05 (Mathematical Analysis)

Aim: to introduce the Simplex Functional and its use in multivariate interpolation. Application of the Simplex functional to error formulas for multivariate Lagrange interpolation and Kergin interpolation will be discussed.

Course contents:

I. Definition and main properties of the Simplex functional.

II. Application of the Simplex functional to error formulas for multivariate Lagrange interpolation (Sauer-Xu error formula, de Boor error formula for Lagrange interpolation at natural lattices).

III. Mean value interpolations (Kergin and Hakopian). Characterization of the projectors that preserve homogeneous partial differential relations.

IV. Approximations properties of mean value interpolation polynomials. Extremal points for Kergin and Hakopian interpolation. Approximation of entire functions.

V. Interpolation at Leja points for the disk. Computational problems.