UNIVERSITÄT SALZBURG

Fachbereich Mathematik
Hellbrunnerstraße 34
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Gastvortrag

Donnerstag, 22. Mai 2014
11 Uhr c.t.
Seminarraum I

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Metric projections onto finite dimensional subspaces of spaces of continuous functions – from 1855 to 2013

Let $C_0(T)$ be the Banach space of continuous real valued functions on the locally compact Hausdorff space T and let M be a finite dimensional subspace of $C_0(T)$. For any f in $C(T)$, let dist (f, M) be the distance of f to M and let $P_M(f)$ be the set

$$P_M(f) = \{g \in M: \|f - g\|_\infty = \text{dist}\,(f, M)\}.$$

such that $P_M(f)$ is a non-empty closed convex subset of M.

In the 50's there arose the question whether the so called metric projection P_M admits a continuous selection, i.e., a continuous mapping s from $C_0(T)$ into M such that

$$s(f) \in P_M(f) \qquad \text{for all } f \in C_0(T).$$

A bit of the answer is "not always". But by Michaels's celebrated selection theorem the answer is yes if the metric projection is lower semicontinuous.

In 1855 Chebyshev already considered best approximations to f in $C([0,1])$ form the space M of polynomial functions of degree $\leq n$ or the space of trigonometric polynomials of degree $\leq 2n + 1$.

The talk will be concerned with the interaction of the properties of T, $C_0(T)$ and M and will describe the development of the theory from 1950 to the present and the state of today's knowledge.

Einladender: G. Racher