Zahlentheoretisches Kolloquium

Freitag, 29. 5. 2015, 14:00 s.t.

Seminarraum C 208, 2. Stock, Steyrergasse 30, TU Graz

Strange products of projections

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Let X and Y be two closed subspaces of a Hilbert space. If we send a point back and forth between them by orthogonal projection, the iterates converge according to von Neumann to the projection of the point onto the intersection of X and Y.

If H is an infinite dimensional Hilbert space, there exist three orthogonal projections X_1, X_2, X_3 onto closed subspaces of H, $z_0 \in H$ and a sequence of indices $k_1, k_2, \cdots \in \{1, 2, 3\}$ so that the sequence of iterates defined by $z_n = X_{k_n} z_{n-1}$ does not converge in norm.

We will explain how this implies that in every infinite dimensional Hilbert space there exist three orthogonal projections X_1, X_2, X_3 onto closed subspaces of H such that for *every* $0 \neq z_0 \in H$ there exist $k_1, k_2, \cdots \in \{1, 2, 3\}$ so that the sequence of iterates $\{z_n\}_{n=0}^{\infty}$ does not converge in norm.

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