Karlstad Applied Analysis Seminar (2025)

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On quasi-isometric liftings for operators on Hilberts spaces

Abstract

This presentation investigates quasi-isometric liftings for operators on Hilbert spaces that are similar to contractions. A bounded linear operator T is said to be a quasi-isometry if it acts as an isometry on its range. The case of operators that are contractive on their range is also explored, providing a clear illustration of how the developed theory parallels the classical contraction setting. Special attention is given to liftings that are left-invertible and also liftings that resemble the classical Nagy–Foiaș isometric liftings for contractions.

The analysis highlights the role of wandering subspaces, as well as the Cauchy dual operator, in the study of left-invertible operators. These operators are significant due to their special actions and their connection with model theory, as they can be transformed into multiplication operators on model spaces such as classical function spaces including Lebesgue, Hardy, and Dirichlet spaces. As a consequence, the operators that admit such liftings can be also seen on model spaces and so they can be used in order to prove general interpolation problems for analytic functions.