

Approximation problems in model spaces and beyond

Adem Limani

Lund University

The model spaces are the invariant subspaces for the backward shift operator on the Hardy space H^2 , where the label “model space” stems from the classical theory of Sz.-Nagy and Foias, which says that any contractive and completely non-unitary linear operator on a Hilbert space can be modeled by the backward shift on a certain model space. Besides their intrinsic operator theoretical nature, these spaces also enjoy some very subtle function theoretical properties. For instance, a classical theorem on approximations in model spaces by A. Aleksandrov says that functions in a model space which extend continuously to the boundary form a dense subset, despite the fact that in many instances, it is very difficult to construct even a single such function. In this talk, we shall investigate the mechanisms which determine when classes of functions enjoying certain regularity properties on the boundary, form a dense subset in the model spaces. We shall also explore some extensions of these problems to the setting of de Branges-Rovnyak spaces and illustrate a recent connection to the theory of subnormal operators. This talk is based on a series of recent collaborative works together with Bartosz Malman (KTH).