

PhD

Pre-Defense

MODELS OF LINEAR OPERATORS SATISFYING OPERATOR INEQUALITIES

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DATE: Monday, 4 May 2020 - 12:00

VENUE: ONLINE - URL: <https://conecta.csic.es/b/jos-ajp-qp4>

ABSTRACT: A general spectral theory of a linear operator does not exist, it only exists for particular subclasses of operators. One of the most celebrated theories of this type is the Nagy-Foias , spectral theory of Hilbert space contractions, obtained in the 1960ies. It is based on the construction of a functional model, which heavily relies on certain chapters of Complex Analysis, such as the theory of Hardy spaces.

Being a contraction on a Hilbert space is characterized by a very simple operator inequality. In a landmark work of 1982, Agler showed how to pass from some other operator inequalities to a functional model of an operator by applying more general reproducing kernel Hilbert spaces instead of Hardy spaces. This work motivated an extensive research, which has become a rapidly growing branch of Operator Theory.

I will explain how to construct an explicit functional model for an operator satisfying a rather general operator inequality, and discuss the uniqueness of this model. Some spectral consequences in the spirit of the Nagy-Foias , theory will be derived. I will also explain a new connection with the ergodic theory of linear operators.