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Filtration Families of Semigroup Generators: Structure, Geometry, and Dynamics

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Abstract

This talk addresses two important problems in generation theory. The first concerns criteria for determining whether a given holomorphic function is an infinitesimal generator, while the second examines how properties of a generator influence the dynamical behavior of the associated semigroup.

Recently, some advances using filtrations of generators have been achieved. Various filtrations have been introduced from different perspectives and for diverse purposes. We systematize the study of filtrations by synthesizing known and new results.

Particular attention is given to dynamical aspects, including uniform convergence on the unit disk and sectorial analytic extension of semigroups with respect to their parameter. In addition, the Fekete–Szegö problem is solved over certain filtration classes and nonlinear resolvents.

The talk is based on the joint work with Mark Elin.