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**Eigenvalues expansions for
generalized Laguerre semigroups**

Pierre PATIE (Cornell University)

We define the generalized Laguerre semigroups as the semigroups of stationary Feller processes associated to self-similar positive Markov processes. The terminology is motivated by the spectral expansion of this semigroup which is given in terms of the Laguerre polynomials when the associated self-similar process is a Bessel process. We proceed by showing the existence of an intertwining relationship between this class of non-self-adjoint semigroups and the one of the classical Laguerre semigroup which is self-adjoint. Exploiting this connection, we discuss eigenvalues expansions by describing explicitly the sequence of eigenfunctions and providing sufficient conditions for the existence of co-eigenfunctions, that is eigenfunctions for the dual semigroup. Relying on the concept of frames, which have been developed in non-harmonic analysis, we also explain why this spectral expansion is indeed possible on a space of functions which is large enough for the description of the semigroups but fails on the full Hilbert space generated by the invariant measures of the semigroups. If time allows, we will also present an interesting connection with the Krein theory of strings.

This study is carried jointly with Mladen Savov (University of Reading, UK).