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	Soggetti	Spectral theory (Mathematics) Nonselfadjoint operators Laguerre polynomials Partial differential equations -- Spectral theory and eigenvalue problems -- General topics in linear spectral theory Operator theory -- Groups and semigroups of linear operators, their generalizations and applications -- Markov semigroups and applications to diffusion processes Approximations and expansions -- Approximations and expansions -- Asymptotic approximations, asymptotic expansions (steepest descent, etc.) Probability theory and stochastic processes -- Distribution theory -- Infinitely divisible distributions; stable distributions Harmonic analysis on Euclidean spaces -- Nontrigonometric harmonic analysis -- General harmonic expansions, frames Sequences, series, summability -- Inversion theorems -- Tauberian theorems, general Functions of a complex variable -- Entire and meromorphic functions, and related topics -- Functional equations in the complex domain, iteration and composition of analytic functions Integral transforms, operational calculus -- Integral transforms, operational calculus -- Transforms of special functions
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and main results -- 1.1. Characterization and properties of gL semigroups -- 1.2. Definition and properties of subsets of \Ne -- 1.3. Eigenvalue expansion and regularity of the gL semigroups -- 1.4. Convergence to equilibrium -- 1.5. Hilbert sequences and spectrum -- 1.6. Plan of the paper -- 1.7. Notation, conventions and general facts -- Chapter 2. Strategy of proofs and auxiliary results -- 2.1. Outline of our methodology -- 2.2. Proof of Theorem ??? (???) -- 2.3. Additional basic facts on gL semigroups -- Chapter 3. Examples -- Chapter 4. New developments in the theory of Bernstein functions -- 4.1. Review and basic properties of Bernstein functions -- 4.2. Products of Bernstein functions: new examples -- 4.3. Useful estimates of Bernstein functions on \C -- Chapter 5. Fine properties of the density of the invariant measure -- 5.1. A connection with remarkable self-decomposable variables -- 5.2. Fine distributional properties of _{ } -- 5.3. Proof of Theorem ??? (???) -- 5.4. Small asymptotic behaviour of \nuh and of its successive derivatives -- 5.5. Proof of Theorem ??? -- 5.6. Proof of Theorem ??? -- 5.7. End of proof of Theorem ??? -- Chapter 6. Bernstein-Weierstrass products and Mellin transforms -- 6.1. Exponential functional of subordinators -- 6.2. The functional equations (???) and (???) on \R -- 6.3. Proof of Theorem ??? -- 6.4. Proof of Proposition 6.1.2 -- 6.5. Proof of Theorem ??? (???): Bounds for -- 6.6. Large asymptotic behaviours of along imaginary lines -- 6.7. Proof of Theorem ??? (???) -- 6.8. Proof of Theorem 6.0.2 (2b): Examples of large asymptotic estimates of | | -- Chapter 7. Intertwining relations and a set of eigenfunctions -- 7.1. Proof of Theorem ??? -- 7.2. End of the proof of the intertwining relation (7.3). 7.3. Proofs of Theorem ??? (???) and (???) -- 7.4. Proof of the uniqueness of the invariant measure -- 7.5. Proof of Theorem ??? -- Chapter 8. Co-eigenfunctions: existence and characterization -- 8.1. Mellin convolution equations: distributional and classical solutions -- 8.2. Existence of co-eigenfunctions: Proof of Theorem ??? -- 8.3. The case \Ne_{,}. -- 8.4. The case \Ne_{}\Nii -- 8.5. The case \Ne^{ }_{}. -- Chapter 9. Uniform and norms estimates of the co-eigenfunctions -- 9.1. Proof of Theorem 2.1.5 (1) via a classical saddle point method -- 9.2. Proof of Theorem 2.1.5 (2) via the asymptotic behaviour of zeros of the derivatives of -- 9.3. Proof of Theorem ??? (???) through Phragmén-Lindelöf principle -- Chapter 10. The concept of reference semigroups: \Lnu-norm estimates and completeness of the set of co-eigenfunctions -- 10.1. Estimates for the \lnu norm of \nun -- 10.2. Completeness of (\nun)_{ 0} in \lnu -- Chapter 11. Hilbert sequences, intertwining and spectrum -- 11.1. Proof of Theorem ??? -- Chapter 12. Proof of Theorems ???, ??? and ??? -- 12.1. Proof of Theorem 1.3.1 (2) -- 12.2. Proof of Theorem ??? (???) -- 12.3. Heat kernel expansion -- 12.4. Expansion of the adjoint semigroup: Proof of Theorem ??? -- 12.5. Proof of of Theorem ???: Rate of convergence to equilibrium -- Bibliography -- Back Cover.

Sommario/riassunto

"We provide the spectral expansion in a weighted Hilbert space of a substantial class of invariant non-self-adjoint and non-local Markov operators which appear in limit theorems for positive-valued Markov processes. We show that this class is in bijection with a subset of negative definite functions and we name it the class of generalized Laguerre semigroups. Our approach, which goes beyond the framework of perturbation theory, is based on an in-depth and original analysis of an intertwining relation that we establish between this class and a self-adjoint Markov semigroup, whose spectral expansion is expressed in terms of the classical Laguerre polynomials. As a by-product, we derive smoothness properties for the solution to the associated Cauchy problem as well as for the heat kernel. Our methodology also reveals a

variety of possible decays, including the hypocoercivity type phenomena, for the speed of convergence to equilibrium for this class and enables us to provide an interpretation of these in terms of the rate of growth of the weighted Hilbert space norms of the spectral projections. Depending on the analytic properties of the aforementioned negative definite functions, we are led to implement several strategies, which require new developments in a variety of contexts, to derive precise upper bounds for these norms"--