

## SEMINARIO

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# ***A new spectral theory: A complex analytic intrinsic theory with applications to the Connes-Moscovici spectrum, which matches the zeros of zeta and to linear perturbations of black-holes***

**Abstract:** I propose a new paradigm for the spectral theory of ODEs with analytic coefficients.

The classical approach is based on Hilbert spaces and linear operators (non necessarily bounded). My approach is based on analytic continuation in the complex domain and  $k$ -summability, otherwise speaking on wild monodromy. My analytic spectra are intrinsic, the boundary conditions are "contained in the equation". I recently discovered that this last concept was clearly formulated by Erwin Schrödinger in a letter of december 27th 1925 in relation with the hydrogen spectrum. The analytic spectra are compatible with some "natural transformations" of ODEs as  $s$ -homotopic transformations and gauge transformations. There are strong relations with special functions theory and the spectra appearing in natural sciences are in a lot of cases analytic spectra. There are numerous examples in quantum chemistry and in black holes theory. The analytic spectra are defined by the fact that the eigenfunctions are special solutions connecting local special solutions a two singular points. These local special solutions are, by definition, eigenfunctions of the monodromy at a regular singular points and sum of an eigenfunction of the exponential torus (formal pure wave) at an irregular singular points.

I will explain my understanding of the ideas of Schrödinger on the hydrogen spectrum at the end of 1925, when he discovered the equation that bears his name. He gave a first version of my notion of spectrum. This allows a new look on Schrödinger's discovery. After I will present some applications. I will limit myself to the analytic spectra of the Confluent Heun Equations (CHE). The CHEs are the rational linear second order ODEs admitting two regular singular points and an irregular singular point. Recently such equations appeared in a lot of applications.

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