

SPECTRAL ORTHOGONAL POLYNOMIALS AND DIFFERENTIAL GALOIS THEORY

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In this talk we present a Differential Galois Theory approach to study the Schrödinger equation with polynomial potentials. We obtain the algebraic spectrum, values of energy in which the Schrodinger equation is integrable in Galoisian sense, of harmonic and anharmonic oscillators. In particular, for the sextic anharmonic oscillator we recover the classical Bender - Dunne polynomials as spectral orthogonal polynomials, that is, the algebraic spectrum of the Schrödinger equation with polynomial potential of degree six which corresponds to the zeroes of the Bender-Dunne spectral polynomials. Generalizations of this approach, such as decatic potentials, are also presented.

Joint work with Henock Venegas (Universidad del Atlántico, Colombia).