SEMINARIO

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Time-dependent exactly solvable potentials generated by Darboux and point transformations

Abstract: The appropriate form-preserving point transformation is introduced in order to deform a given stationary Schrödinger equation into one with time-dependent potential. This construction allows to obtain a set of orthogonal solutions inherited from the stationary system, where the orthogonality of the set is guaranteed from the preservation of the inner product. The respective constants of motion (invariant operators) are extracted in a straightforward form by simply performing the appropriate mapping and exploiting the preservation of the first integrals available in the initial system. In particular, it is shown that the parametric oscillator is obtained as a deformation of the harmonic oscillator. Lastly, a new family of time-dependent potentials is generated after combining the Darboux and point transformations, leading to a generalization of the Abraham-Moses-Mielnik potential.

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