

Contribution Title: POLYNOMIALS TRANSFORMATIONS AND CONDITIONALLY EXACTLY SOLVABLE POTENTIALS
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With the help of associated Laguerre polynomial with arbitrary power of its argument, general potential forms satisfying the radial Schrödinger equation has been studied. With the appropriate power of its argument the Schrödinger equation with Coulomb, Harmonic and other potential forms are obtained with their eigenvalues[1]. Other choice of the argument will be provided as new potentials, their eigenvalues eigenfunctions. In certain cases, we obtained complex eigenvalues. These complex eigenvalues provide a wide range of applications in scattering problems [2,3]. Supersymmetry quantum mechanics (SUSY QM) can be worked out with any starting normalized wave function such that the energy eigenvalue of that state for the Hamiltonian corresponds to H_1 be zero. We have also seen the coordinate transformation employed in generating other solvable SUSY potentials. Extending this idea, we have studied orthogonal polynomials with functionally transforming their arguments. Then on comparing its original Hamiltonian satisfying the Schrödinger equation, we estimate the potential forms, which in general be different from that of the original case. Detailed will be discussed in the conference.

[1] Arfken G. "Mathematical methods for Physics" 3rd ed. Chap 13 New York.

[2] Bender C M et al. (1999) J. Phys. A: Math. Gen. **32** 6771.

[3] De Vincenzo S and Alonso V (2002) Phys. Lett. **A 298** 98.