

1103-33-62

Ash Arsenault* (asharsenaul0@upei.ca), 487 Corrigan Rd., Mt. Stewart RR#1, PE C0A1T0, Canada. *Using supersymmetric quantum mechanics to generate families of solvable potentials.*

Supersymmetry is a mathematical concept which arose from Quantum Field Theory. However, its development led to investigations of its applications in other areas of physics. Notably, its utility in traditional quantum mechanics was so fruitful that it led to the birth of an entire new field, which we call supersymmetric quantum mechanics, or SUSY QM.

Supersymmetric quantum mechanics is an effective tool that exploits the relationship shared by a pair of supersymmetric partner potentials in order to construct exact solutions of these potentials. In the present work, which introduces solvable classes of the generalized Riccati equation into the realm of SUSY QM, a general method for constructing infinite classes of exactly solvable potentials and their solutions is presented. The isotonic nonlinear oscillator potential, the spiked harmonic oscillator potential and the Kratzer potential are constructed in this work using this general method, although the extension of its application to other classes is also feasible, making this method a powerful technique which can be used to find exact solutions for a wide variety of quantum systems. The construction of the associated exceptional and classical orthogonal polynomials for these families of solvable potentials is also presented. (Received August 11, 2014)