1116-81-1703   **Ian Marquette*** (`i.marquette@uq.edu.au`), The University of Queensland, School of
Mathematics and Physics, Brisbane, QLD 4072, Australia. *Ladder Operators for
Rationally-Extended Potentials Connected with Exceptional Orthogonal Polynomials and
Superintegrability.*

I will review results concerning k-step extension of the harmonic oscillator and the radial oscillator. These 1D exactly solvable systems are related to Hermite and Laguerre exceptional orthogonal polynomials of type III and allow different types of ladder operators. I will show how ladder operators involving no isolated multiplets exist and can be constructed via combinations of Darboux-Crum and Krein-Adler SUSYQM approaches. I will also discuss the application to 2D superintegrable systems and derivation of their energy spectrum using finitely generated polynomial algebras and their finite dimensional unitary representations. I will also discuss how 1-step and 2-step extension of the harmonic oscillator are connected with an Hamiltonian involving the fourth Painlevé transcendent. (Received September 21, 2015)