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A Method to Solve the Schrödinger Equation for Any Power Hypercentral Potentials

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Abstract: An exact closed form of solution to the hyperradial Schrödinger equation is constructed for any general case comprising any hypercentral power and inverse-power potential. The hypercentral potential depends only on the hyperradius, which itself is a function of Jacobi relative coordinates that are functions of particle positions ($r_1, r_2, \ldots, r_N$). This article is mainly devoted to the dernonstrat of the fact that any ψ of the form ψ=power series × exp(polynomial)=[f(x)exp(g(x))] is potentially a solution of the Schrödinger equation, where the polynomial g(x) is an ansatz depending on the interaction potential.

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Key words: power, hypercenteral potential, Shrödinger equation

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