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Title:	Accidental degeneracy of the hydrogen atom and its non-accidental solution in parabolic coordinates.
Authors:	Mandal, Ankur (/jspui/browse?type=author&value=Mandal%2C+Ankur)
Keywords:	Accidental degeneracy the hydrogen atom parabolic coordinates
Issue Date:	2021
Publisher:	Canadian Science Publishing
Citation:	Canadian Journal of Physics, 99(10), 853-860.
Abstract:	The degeneracy associated with dynamical symmetry of a potential can be identified in quantum mechanics, by solving the Schrödinger equation analytically, using the method of separation of variables in at least two different coordinate systems, and in classical mechanics by solving the Hamilton–Jacobi equation. In the present pedagogical review, the notion of separability and superintegrability of a potential, with profound implications, is discussed. In an earlier tutorial paper, we addressed the n2-fold degeneracy of the hydrogen atom using the Casimir operators corresponding to the SO(4) symmetry of the 1/r potential. The present paper is a sequel to that work, in which we solve the Schrödinger equation for the hydrogen atom using separation of variables in the parabolic coordinate systems. In doing so, we take the opportunity to revisit some excellent works on symmetry and degeneracy in classical and quantum physics, if only to draw attention to these insightful studies, which unfortunately miss even a mention in most undergraduate and even graduate level courses in quantum mechanics and atomic physics.
Description:	Only IISER Mohali authors are available in the record
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