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Reviewer: M. Znojil
Reviewer number: 013388
Address:
Theory Group, Nucl. Phys. Institute ASCR, 250 68 Řež, Czech Republic
Author: Bruno Blaive and Michel Cadilhac
Short title: Expansion of the hydrogen-like wavefunctions
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Primary classification: 81Q
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Review text: Schroediger equation with Coulomb potential describes one of the most important quantized systems with both the discrete (negative) and continuous (positive) energies. The paper makes use of the fact that both these “halves” of the spectrum have a common boundary at E = 0. The authors show that their older Bessel-function expansion of the Coulombic wave functions (applicable to the discrete states which lie “close enough” to E = 0 from below) may be also (under similar limitations) extended to the low lying scattering states with E ¿ 0.

Convergence remains uniform on a bounded interval of coordinates. An interesting consequence of the analysis (paying thorough attention to the specific E ¿ 0 difficulties) is a discovery of an almost complete analogy (and regularity of transition) between the two infinite series. In both cases the expansion parameter is a square root of the inverse energy, and one has only to pay due care to the (in general, complex) normalization constant.