

Abstract Submitted
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Critical parameters and exact number of bound states for central potentials EVGENY LIVERTS, Racah Institute of Physics, The Hebrew University , Jerusalem 91904 — Quantum states of zero energy are defined as the transition between bound states of negative energy and free states of positive energy. The boundary conditions for the transition states as solutions of the non-relativistic Schrodinger equation are determined. The critical parameters of widely used central potentials are defined as corresponding to the transition states. Two exact methods, and an approximate method of the second order WKB, were proposed for calculating the critical parameters of central potentials. The numerical results in the form of tables of the critical parameters for several well known central potentials are presented. The above results enable us to answer three important questions:

- i) What is the number of bound states for given central potential and given orbital quantum number l ;
- ii) What is the maximum value of l which can provide the bound states for the given central potential;
- iii) What is the order of energy levels for the given form of the central potential.

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