

BOOK REVIEW

The Kepler Problem: Group Theoretical Aspects, Regularization and Quantization, with Application to the Study of Perturbation, by Bruno Cordani, Birkhäuser, Basel, 2002, xvii + 439 pp. + CD included, ISBN 3-7643-6902-7

Different versions of the famous Kepler problem are important for a wide variety of applications in mathematical and physical problems. In particular, the last three decades have seen an explosion of applications to quantum mechanics (geometric quantization, magnetic monopoles, etc.) and celestial mechanics. So, the need of a systematic exposition of all its classical and modern aspects is rather tangible. In some broader sense the book offers a comprehensive treatment of the Kepler problem, i.e. the two body problem but it should be remarked that it does not provide neither encyclopedic collection of various aspects of the problem nor presents a historical survey. An adequate idea of its spirit can be found in the following extract from the *Introduction*:

“ *The aim of this book is rather ambitious: to gather and order in a logical way most of the important ideas published on the various aspects of the Kepler problem... ”*

One might trace three main directions of contemporary development in the studies of two body problem:

1. the existence of a symplectomorphism between the phase space of the regularized Kepler problem and the cotangent bundle of the n -dimensional sphere with its zero section removed [7]
2. the existence of a symplectomorphism between the cotangent bundle of the n -dimensional sphere and the coadjoint orbit of the $SO(n+1, 2)$ Lie group [5, 6]
3. the interpretation of the Kepler motion as a result of an extension of the canonical transformation corresponding to the geodesic motion on the sphere [2].