

Periodic, Quasi-Periodic and Chaotic Motions in Celestial Mechanics:
Theory and Applications

Periodic, Quasi-Periodic and Chaotic Motions in Celestial Mechanics: Theory and Applications

Selected papers from the Fourth Meeting on Celestial Mechanics, CELMEC IV
San Martino al Cimino (Italy), 11–16 September 2005

Edited by

A. Celletti

Dipartimento di Matematica, Università di Roma “Tor Vergata”, Italy

and

S. Ferraz-Mello

Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Universidade de São Paulo, Brasil

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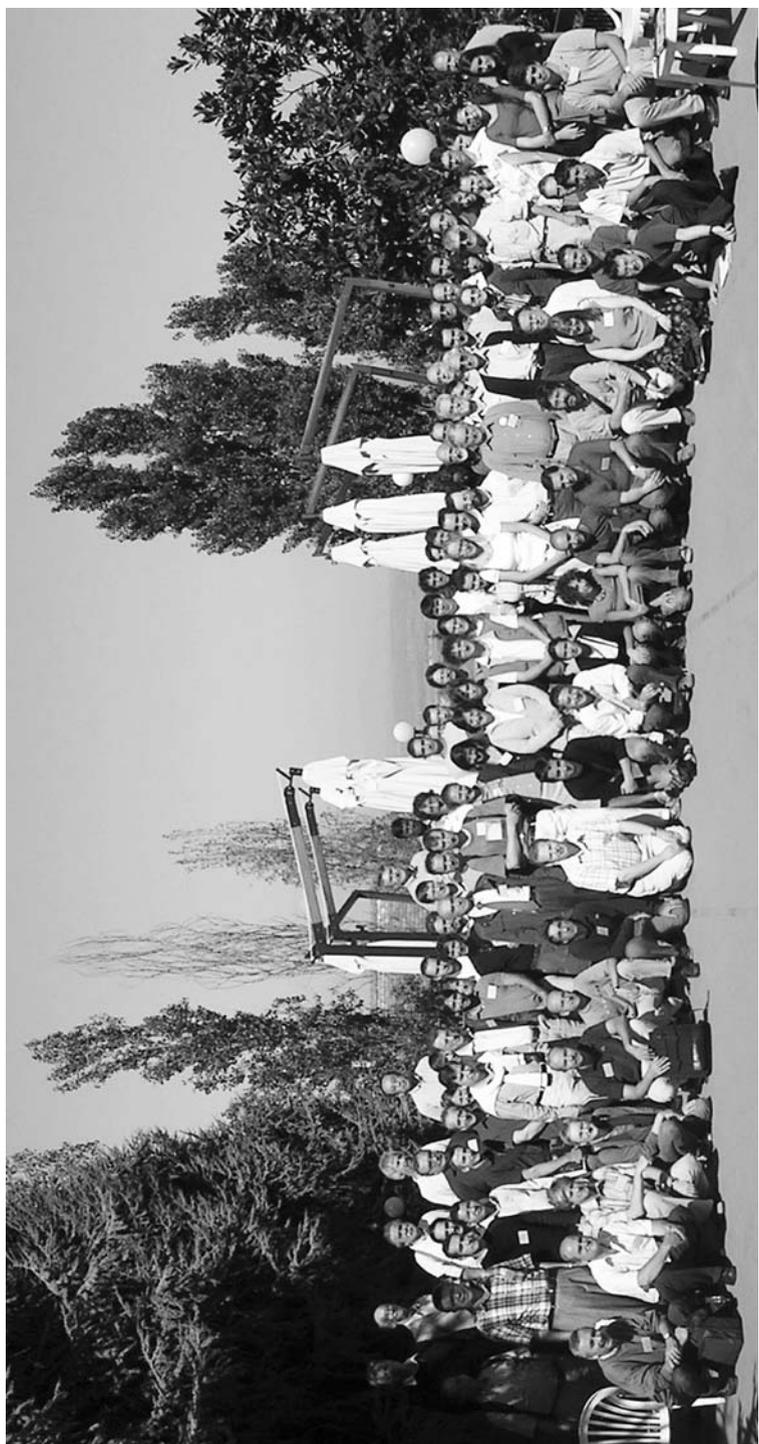
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Cover image: Resonances, tori and chaotic motions in a pendulum-like system through Fast Lyapunov Indicators. ***Courtesy of:*** A. Celletti, C. Froeschlé, E. Lega.



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Preface

Alessandra Celletti · Sylvio Ferraz-Mello

The Fourth International Meeting of Celestial Mechanics—CELMEC IV—took place in the welcoming landscape of San Martino al Cimino, about 100 km north of Roma, during the period 11–16 September 2005. Following the tradition of the previous CELMEC meetings (taking place every 4 years), the goal was to gather together scientists from the different communities involved in Celestial Mechanics (such as universities, astronomical observatories, space agencies, research institutes and industries). This synergy was aimed to satisfy the demand of comparing complementary ideas and techniques on the recent advances in Celestial Mechanics. The meeting was particularly crowded with respect to the previous editions, thanks to the participation of about 130 people coming from all over the world.

The strong interdisciplinary character of modern Celestial Mechanics is witnessed by the different contributions presented in the current publication, ranging from advanced mathematical theories to sophisticated numerical investigations of the solar system dynamics. Each section is opened by review papers, which introduce to leading subjects, like the variational approaches to find periodic orbits, the stability theory of the N-body problem, the spin-orbit resonances and chaotic dynamics, the space debris polluting the circumterrestrial space. The subsequent research papers encompass many key topics of Celestial Mechanics, often bridging from theory to applications, from dynamical system theory to planetary science, from natural to artificial satellite theory. This nice intermingling of subjects was made possible by the enthusiastic presentations and discussions of the participants.

A. Celletti (✉)
Dipartimento Di Matematica, Universita' Di Roma Tor Vergata,
Via Della Ricerca Scientifica, Roma 133, Italy
e-mail: celletti@mat.uniroma2.it

S. Ferraz-Mello
IAG-Universidade de Sao Paulo, Rua do Matao,
1226, Cidade Universitária, CEP 05508-900
Sao Paulo, Brazil
e-mail: sylvio@usp.br

The CELMEC IV organizing committee was composed by Alessandra Celletti (Università di Roma “Tor Vergata”), Andrea Milani (Università di Pisa), Ettore Perozzi (Telespazio, Roma) and Giovanni B. Valsecchi (Istituto Nazionale di Astrofisica—IASF, Roma). The realization of the meeting was made possible thanks to the financial supports provided by the following institutions: University of Roma “Tor Vergata” and its Department of Mathematics, Gruppo Nazionale per la Fisica Matematica (GNFM), Telespazio, European Space Agency (ESA), University of Pisa, National Institute for Astrophysics (INAF), Balletti Park Hotel; a special thank to Antonio Giorgilli for his financial contribution through the University of Milano Bicocca. These sponsors allowed many young people and researchers from developing countries to attend the meeting. CELMEC IV was promoted by the Italian Society of Celestial Mechanics and Astrodynamics (SIMCA) and it was hosted by the Balletti Park Hotel (San Martino al Cimino, Viterbo), which provided a very handsome atmosphere.

All authors were encouraged to write papers of a length that they considered suitable for the presentation of their results. The editors and the editorial board of “Celestial Mechanics and Dynamical Astronomy” arranged for competent and fast refereeing so that all papers could be reviewed and, when necessary, revised before publication.

Alessandra Celletti and Sylvio Ferraz-Mello