

COMMISSION A4 CELESTIAL MECHANICS AND DYNAMICAL ASTRONOMY

MÉCHANIQUE CÉLESTE ET ASTRONOMIE DYNAMIQUE

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TRIENNIAL REPORT 2015-2018

1. Introduction

The present Commission A4 (Celestial Mechanics and Dynamical Astronomy) was formed following the reorganization of the IAU during the Honolulu General Assembly in 2015. Even if the alphanumeric denomination changed, our aims and interests have remained faithful to the original Commission 7 which existed prior to 2015. In its core, Celestial Mechanics and Dynamical Astronomy deals primarily with the general dynamics of N-body systems, with applications stretching from orbital mechanics of artificial satellites to galactic dynamics. Although it constitutes one of the oldest fields in astronomy, our research interests are constantly reinvigorated by new discoveries and problems. These are widespread and include (among many others) extrasolar planets, asteroids and KBOs, NEOs and space debris, low-energy interplanetary trajectories, etc.

The main objective of Commission A4 is to support research and educational activities in the broad field of dynamical astronomy. These include: treatments of the mathematical, physical and computational aspects of planetary theory, perturbation theory, resonance models, chaos and diffusion, stability criteria, orbital and space mechanics, ring systems, tidal models, galactic dynamics, non-gravitational forces, and computer languages for analytical developments.

2. Developments within the past triennium

As discussed in the proposal for the creation of Commission A4, one of our main objectives during the 2015-2018 triennium has been to promote the organization of a summer school on Celestial Mechanics. Inspired by the NATO Advanced Study Institute, held in Cortina d'Ampezzo (Italy) in the 1980s and 1990s, we aimed to include both theory of general dynamics (especially analytical methods) as well as the current astronomical problems.

The first edition of this summer school took place on August 2017, the week before the CELMEC meeting at Viterbo (Italy), and focused primarily on satellite dynamics and space missions. It included lectures by Sylvio Ferraz-Mello, Antonio Giorgilli, Anne Lemaître, Andrea Milani, Josep Modelo, Daniel Scheeres and Massimiliano Vasile, and

was attended by over 80 PhD students and young researchers from all over the world. All lectures were video-recorded and posted on a public YouTube channel. Commission A4 participated actively in designing and promoting the school and will continue to support future editions in incoming years.

In order to facilitate communication and interaction with commission members, in 2015 we began to distribute an electronic Newsletter with information that may be of interest to our community. This included announcements of upcoming meeting and schools, preprints of reports written by our Commission and associated Working Groups, as well as any additional news. We believe such a bulletin serves as an important link between the Commission Organizing Committee and IAU members, and hope to continue this effort during the next period.

Finally, Commission A4 also participated actively in supporting scientific meetings, in particular IAU Symposia and Focus Meetings.

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