



BOOK REVIEW

The Restricted Three-Body Problem and Holomorphic Curves, by Urs Frauenfelder and Otto van Koert, Birkhäuser, Cham 2018, xi+374pp, ISBN 978-3-319-72277-1.

This book is an updated compilation of the recent and not so recent developments on the so called *restricted three-body problem*, which is a special case of the general three-body problem consisting of taking the limit of null mass of the third body that is called the *satellite*. In this way, the two primary bodies (for instance Earth and the Moon) are moving each one around the other in a constant plane since the satellite does not alter their motion. If the satellite also moves in the same plane, the problem is called the *planar restricted three-body problem*. If the satellite is allowed to move in another plane, it is called the *spatial restricted three-body problem*. An additional and usual simplification is to consider that the two primary masses are rotating in circular orbits around their center of mass. The problem is then called the *circular restricted three-body problem*. In this case, by taking a rotating frame placed at the center of mass, the two primaries remain at fixed positions on a line through the origin of coordinates. According to the authors, Jacobi showed that the Hamiltonian of the circular restricted three-body problem in this rotating frame is autonomous (time-independent) and therefore a constant of the motion, which no longer happens for the elliptic restricted three-body problem. These approximations are usually applied to study the motions of satellites around the Earth-Moon system, but also around the Sun-Jupiter system or even around the Pluto-Charon or Jupiter-Europa systems. The tools the authors handle to study this problem with the above mentioned approximations are symplectic geometry and holomorphic curves. In the introduction the authors sustain a fervent and detailed defence of these tools as the best way to attack the restricted three-body problem. At the same time, the reader then becomes aware that the book will not be easy to read. The book has been published in the collection “Pathways in Mathematics” by Springer, which explains:

Each “Pathways in Mathematics” book offers a roadmap to a currently well developing mathematical research field and is a first-hand information and inspiration for further study, aimed both at students and researchers. It is