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BOOK REVIEW

Integrable Systems in Celestial Mechanics, by Diarmuid Ó Mathúna, Birkhäuser, Boston – Basel – Berlin 2008, x + 234 pp., ISBN 978-0-8176-4096-5

Many modern books on mechanics are perceived as excessively abstract by the reader, which has the disagreeable impression of an awesome machine able, at most, to integrate exactly the harmonic oscillator. To this regard, the book under review is decisively in countertendency, giving the complete analytical solution of three important systems, relevant in Celestial Mechanics. They are the following.

1. The Kepler problem, i.e., the dynamical problem for the gravitational field of a fixed mass.

2. The Euler problem, where the gravitational field is generated by *two* fixed and in general different masses.

3. The Vinti problem, regarding an integrable potential which gives an excellent approximation to the gravitational field of an oblate planet, for example the Earth.

The book is organized as follows.

Chapter 0 is a general introduction and treats mainly the historical development of the three problems. Particular emphasis is given to the second one, starting from Euler itself (which mentions that the problem had already attracted the attention of some of the greatest analysts of his time, but without success) and Lagrange. They were the first mathematicians able to reduce the problem to the quadrature, recognizing the need to resort to the elliptic functions (whose theory was at the early stage) for the explicit integration. For a simple but modern introduction to the elliptic functions (lacking in the book) see for example [1].

Chapter 1 recalls briefly the Lagrange equations, ignorable coordinates and relative first integrals, separable systems and Liouville form. Notice that further