Kapitel 2
Problemstellungen und Eulers Lösungsmethoden

2.1 Probleme der Himmelsmechanik im 18. Jahrhundert


1 Cf. [Wilson 1989b], p. [233].
2 Ofer Gal bemerkt zurecht, dass man die „Entdeckung“ des Gravitationsgesetzes keiner Person zuschreiben könne, „... because ISL [i.e., inverse square law] was never ‘discovered’. It had been suggested, speculated and hypothesized by different people, for different reasons, in different contexts, to fulfill different goals.“, cf. [Gal 2002], p. 169.
Edmund Halley schrieb in der Januar-Ausgabe der Philosophical Transactions von 1686: „The Affections of Properties of Gravity, and its manner of acting upon Bodies falling, have been in a great measure discovered, and most of them made out by Mathematical demonstration in this our Century, by the accurate diligence of Galileus, Torricellius, Hugenius, and others, and now lately by our worthy Country-man Mr. Isaac Newton, (who has an incomparable Treatise of Motion almost ready for the Press) which Properties it may be very material here to enumerate, that they may serve for a Foundation to all those that shall be willing to spend their Thoughts in search of the true Cause of this descent of Bodies.“

Eine wichtige Person, die es verdient, in diesem Zusammenhang genannt zu werden und die Halley nur unter „and others“ subsumierte, ist Robert Hooke.

Dieser publizierte 1674 „Allgemeine Gesetze der mechanischen Bewegung“: „First, That all Cœlestial Bodies whatsoever, have an attraction or gravitating power towards their own Centers, whereby they attract not only their own parts, and keep them from flying from them, as we may observe the Earth to do, but that they do also attract all the other Cœlestial Bodies that are within the sphere of their activity; and consequently that not only the Sun and Moon have an influence upon the body and motion of the Earth, and the Earth upon them, but that ☿ also ☪, ☼, ☼, and ♄ by their attractive powers, have a considerable influence upon its motion as in the same manner the corresponding attractive power of the Earth hath a considerable influence upon every one of their motions also. The second supposition is this, That all bodies whatsoever that are put into a direct and simple motion, will so continue to move forward in a straigh line, till they are by some other effectual powers deflected and bent into a Motion, describing a Circle, Ellipsis, or some other more compounded Curve Line. The third supposition is, That these attractive powers are so much the more powerful in operating, by how much the nearer the body wrought upon is to their own Centers. Now what these several degrees are I have not yet experimentally verified; but it is a notion, which if fully prosecuted as it ought to be, will mightily assist the Astronomer to reduce all the Cœlestial Motions to a certain rule, which I doubt will never be done true without it. He that understands the nature of the Circular Pendulum and Circular Motion, will easily understand the whole ground of this Principle, and will know where to find direction in Nature for the true stating thereof. This I only hint at present to such as have ability and opportunity of prosecuting this Inquiry, and are not wanting of Industry for observing and calculating, wishing heartily such may be found, having my self many other things in hand which I would first compleat, and therefore cannot so well attend it. But this I durst promise the Undertaker, that he will find all the great Motions of the World to be influenced by this Principle, and that the true understanding thereof will be the true perfection of Astronomy.“

Am 6. Januar 1679/80 schrieb Hooke an Newton: „[...] my supposition is that the