Copernican Revolution in the Complex Plane
An Algebraic Way to Show the “Chief Point” of Copernican Innovation

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Starting from a simplified model of the Ptolemaic system in the complex plane, we show that Copernicus’ innovation did not merely consist of choosing a reference frame in which the planetary motions were simpler, but in finding the size of the planetary orbits expressed in what we now call astronomical units. In modern times a misleading appeal to relativity and a comparison only on the grounds of precision has led some to consider the Ptolemaic and the Copernican systems as basically equivalent. This erroneous point of view has resulted in the neglect of the main scientific content of the Copernican theory and has left Copernicus only to historians and philosophers of science. It is time to restore Copernicus to the teachers of physics as an incomparable opportunity to show the formidable power of theoretical investigation.

Introduction

It is a widespread and firmly established opinion, clearly expressed by some of the well-known scientific figures of the last century (see Box 1), that the Copernican system may be basically obtained from the Ptolemaic one through a change in the reference frame. This view which had a dramatic impact on the psyche of medieval man became quite trivial in the eyes of the modern physicist accustomed to the ideas of Einstein’s general theory of relativity. Thus, in modern times, Copernicus’s achievement has been belittled to such an extent that the name of Copernicus, the founder of modern science, is rarely mentioned in most modern textbooks of

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physicists. At best, we can find a hint that Copernicus only chose a reference frame in which the motions of the planets were simpler and that he persisted in the error of considering circular orbits. So, the Copernican theory,