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Al-Kashi, the First Scientist Who Introduced Dynamical System

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Abstract

In 15th century, two renowned mathematicians, Ghiyath al-Din Jamshid Mas'ud al-Kashi (also known as Jamshid Kashani; d. 1429) and his patron, Mirza Muhammad Taraghay bin Shahrukh (well known as Ulugh Beg; d. 1449) were able to calculate the sine and chord of one-third of an angle. With this, they successfully computed sine 1 degrees to 17 correct decimal digits (ten correct sexagesimal places) by the invention of ingenious converging iteration algorithm. The iteration algorithm suggested by Al-Kashi one can consider as pioneering dynamical system and Al-Kashi himself can be considered as the initiator, pioneer of the theory of dynamical systems. In this paper we revise Al-Kashi's work on this computation of sine 1 degrees using modern theory of dynamical systems. The main reference for this computation will be based on A Study of Risala al-Watar wa'l Jaib ("The Treatise on the Chord and Sine"), written by Mohammad K. Azarian. In the end, we discuss the significance of this revision in the Islamic point of view.

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