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Uncovering Astronomical Procedures Using Counting-diagrams: The Case of Qin Jiushao's Writing on Chinese Remainder Theorem

Abstract - The Chinese remainder theorem, originally called *Dayan* 大衍 procedure, was first written down by a thirteenth century scholar, Qin Jiushao 秦九韶 [1208-ca.1261 CE] in the *Mathematical Book in Nine Chapters* [*Shushu Jiuzhang* 數書九章, 1247 CE]. Based on a seventeenth century manuscript, transcribed by Zhao Qimei's 趙琦美 [1563-1624 CE] in 1617 CE, this paper aims to rethink the composition of a text for the procedure involving the use of counting-diagrams. Firstly, *Fangcheng* 方程 procedure is analysed. It is argued that there was another use of *Fangcheng* in the context of the astral sciences which differed from the one known through mathematical documents. Secondly, Qin Jiushao's *Dayan* procedure is further studied in two ways: a, the connection Qin establishes between *Fangcheng* and *Dayan* procedures is examined; b, Qin's use of counting-diagrams in order to uncover astronomical procedures is analysed. Finally, Qin Jiushao's personal life is considered as providing appropriate evidence for revealing Qin's effort to write on the Chinese remainder theorem within distinct cultures of computations respectively in mathematics and astronomy. In conclusion, the Chinese remainder theorem can be understood as the textualization of counting rods procedures.