# What Do We Have in Mathematics 2000 Years Ago?: A Study of Arithmetic Based on the Nine Chapters on the Mathematical Art

Hou, Yundi (School: Nanjing Foreign Language School)

Arithmetic is China's brilliant mathematical cultural heritage. With the using of the method of documentation, the thesis discusses two aspects of, from the introduction of the ancient equations and their solution to the comparison between them and modern ideas or foreign ones at that time. From the problem of "well distribution by five families", one of the first indeterminate equation recorded in "the Nine Chapters on the Mathematical Art" in China, we discuss the main algorithms on solving equations in ancient China, such as "multiply numbers respectively", "subtract other rows" and "the method dealing with the sign of numbers", particularly the algorithms of solving the problem on profit and loss and the equation with several unknowns. Secondly, compared with the solution raised in recent years, and the ancient arithmetic opinions mentioned in Western books at that time, we conclude the similarities and limitations among them. The essence of the algorithm reflected in "the Nine Chapters on the Mathematical Art" is similar to the basic method like Gauss-Jordan Elimination used today, with the preliminary thought possessed. Although it has limitation on solving nonlinear problem, the complete thoughts on mathematics have already been exerted. Overall, although containing flaws in it, "the Nine Chapters on the Mathematical Art" is one of the most important achievements on mathematics not only in ancient China, but also worldwide.

**Awards Won:**