

SAW Three-Month Workshop:

Mathematical Practices in relation to the Astral Sciences

Abstract

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VARIOUS TYPES OF NUMBERS, VARIOUS TYPES OF APPROXIMATIONS IN EARLY CHINESE WRITINGS ON MATHEMATICS AND ASTRAL SCIENCES

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The impetus for the talk was provided by an observation of how numbers and quantities are dealt with in most publications on the history of the astral sciences. Most often, at it seems, all quantities recorded in documents of the past are translated into modern terms, that is, into a decimal number system with decimal fractions. Accordingly, the main focus of the discussion is the “accuracy” of the values, and not how actors dealt with numbers and quantities in their work on the heavens. History of ancient mathematics, however, has taught us that a huge historical fieldwork awaits us, with respect to how actors used numbers and quantities in all kinds of contexts, since they did so most often in unexpected ways. Such a historical work would lead us to deal with one of the essential features that could enable us to identify different cultures of computation and quantification in the past. The presentation illustrated this claim using documents in which actors simultaneously put into play in the same text quantities expressed with respect to sequences of measurement units and decimal expansion of a single measurement unit, or else used integers or ordinary fractions instead of decimal fractions. We also examined texts in which powers of ten play an unexpected part in a context in which a decimal place-value notation was supposedly used. These issues are essential to address if we want to understand how approximations were carried out, depending on the types of number system used and the types of approximations sought for.