

## SAW Three-Month Workshop: Mathematical Practices in relation to the Astral Sciences

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**Agathe Keller** (Sphère, CNRS & University Paris Diderot, SAW Project)  
*Reasonings in Pṛthūdhaka's commentaries on Brahmagupta*

**Abstract:** The aim of this presentation/reading was to give a historical background and provide points of comparison and contrast to the kind of reasonings used by Āmarāja (12th century) by looking at Pṛthūdhaka's (ca. 9th century) commentary on similar topics.

A short historiographic presentation of the day on reasoning, underlined how usually reasonings and proofs are ascribed to commentators and not to authors of treatises. However, by looking at Brahmagupta's rules on Sines in Chapter 2 of the *Brahmasphuṭasiddhānta*, it was striking to notice that after giving a Sine table, for increments of 1/8th a sign (*rāśi*, that is 30° or 1/12th of the circumference of the circle- BSS.2.17-18), Brahmagupta proceeds to justify how he obtained some of the key values.

Pṛthūdhaka's commentary on this verse and the following (BSS.19-21), also showed many layers, that somewhat differed from those used by Āmarāja in ways that still need to be made explicit. However it was striking that in both cases, authors draw a diagram before reasoning, and that the diagram appears as a kind of archetype by which one can understand how the values were derived.

Furthermore, Pṛthūdhaka's *vāsanās* (explanations, proofs?) seems to be characterized by the way they use quotations of previous works to show, to use Richard Kremer's expression, "the mathematical tool box", that could be employed to derive these Sine versions. Several different "tools" being used to derive differently a same value.

In several cases Pṛthūdhaka's commentary is reminiscent of an older commentary, Bhāskara's commentary on the *Āryabhaṭīya*; the latter is a 5th century treatise that he quotes several times.