

## SAW Conference

### Mathematical Practices in relation to the Astral Sciences

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#### Progressions and ordered lists of numbers

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#### *Geometrical model and observation in Indian astronomy*

After the introduction of Hellenistic astrology and astronomy, the Indian counterparts underwent a drastic change. It is not yet clear exactly when this change started, but the first flow was the *Yavanātaka* which belonged to the 3rd or 4th century. In this text, the astrology of the Hellenistic origin is found. However, the elements of mathematical astronomy found in the last chapter (Chapter 79) are not Hellenistic, but rather similar to that of Mesopotamia. Āryabhaṭa was the first Indian astronomer who discussed mathematical astronomy of Greek origin using trigonometry and geometrical models. What is important is that the Greek astronomy transmitted to India was that of shortly before Ptolemy. Once the basic models were imported, Indian astronomers devised their own methods of obtaining planetary position. They used two epicycles separately, one *manda* epicycle to explain the eccentricity of planets, and another *śighra* epicycle to deal with the anomaly of a planet's position relative to the sun. Instead of combining the two epicycles, they prepared two correction tables separately and tried to explain the two irregularities by algebraic manipulation and they tried to modify parameters and the sizes of epicycles. Some of these modifications should have resulted from observations. What I would like to discuss is the role of observation in Indian astronomy.