

# The Nature and Structure of Sanskrit Texts on Mathematical Astronomy: A Perspective

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The *Āryabhaṭīyam* (499 A.D.) heralded the drawn of mathematical astronomy in India, and this tradition continued unabated for nearly 1400 years till almost the end of the nineteenth century. During this very long period, several outstanding astronomers who were also able mathematicians, produced in Sanskrit a substantial number of original treatises and/or wrote succinct commentaries on earlier works of their choice.

The astronomical texts can be broadly classified under (i) the Siddhāntas; (ii) Karaṇas; and (iii) Tantras. A siddhāntic text generally deals with measures of time; mean positions of planets; their true positions; planetary conjunctions; their oppositions; heliacal risings and settings; conjunctions of stars and planets; determination of direction, space and time; and instruments. The computations of a siddhāntic text are related to a mahāyuga (43,20,000 years). A Karaṇa text, on the other hand, chooses a contemporary epoch and is in the nature of a manual for planetary and other computations from that epoch. A Tantra is a genre of texts, which also deals with astronomical topics, in addition to serving the purpose of a Karaṇa. Besides, there are two other types: (i) Koṣṭhakas (ancillary tables); and (ii) Vākyaas (plithy sentences or phrases).

Indian astronomers who showed their trigonometrical, geometrical and algebraic acumen in their texts, were also reputed for their extensive astronomical computations, aided by the decimal place-value system developed in India (c. 4th cent. A.D.). For expressing such computations and to conform to the metrical compulsions of their textural compositions, they devised three ingenious methods: (i) alphabetical system; (ii) word-numerals; and (iii) Kaṭapayādi. They also developed comprehensive and precise technical terminology for engendering mathematical astronomy. It is amazing that, in the ancient period, though the astronomers were separated from one another both in space and time (even centuries), their texts vividly reveal scientifically standardized format, each having also its own innovation in its presentation.

The paper attempts to discuss these and allied issues in perspective (PowerPoint presentation).