

## 57.5: Right Ascension and Declination

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The goal of the orbit calculation is to find the position of a body in the sky, given its orbital elements. The final result, the position in the sky, will be given in a coordinate system that is analogous to the longitude-latitude system used to locate places on the surface of the Earth. Imagine rotating the Earth on its axis until the prime meridian ( $0^\circ$  longitude) intersects the direction of the vernal equinox. Then projecting the lines of geographic longitude into the sky gives lines of right ascension for astronomical objects. Similarly, projecting the lines of geographic latitude into the sky give lines of declination.

Here's another way to think of this: imagine the Earth is a hollow glass sphere, with longitude and latitude lines drawn on it. Rotate the Earth on its axis until the prime meridian intersects the direction of the vernal equinox, and hold the Earth still at that position. Now if you are at the center of the Earth and look out toward the sky, the lines drawn on the glass will be lines of right ascension and declination.

Right ascension ranges from  $0^\circ$  to  $360^\circ$ , and declination ranges from  $-90^\circ$  to  $+90^\circ$  (where + is north). Often right ascension is given in units of hours, rather than degrees ( $1 \text{ hour} = 15^\circ$ ). Under this convention, right ascension ranges from 0 h to 24 h.

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