

Elements of Ptolemaic Planetary Longitudes

Eccentricity, e

Ratio of epicycle-to-deferent radii, r/R

Angular location of line of apsides along zodiac

Sidereal period, or mean motion (deg/day)

Synodic period, or mean motion (deg/day)

Location on epicycle at an epochal time

Location of epicycle on deferent at epochal time

Shortcomings of Ptolemaic Astronomy

Shortcomings expressly identified by Islamic astronomers

Moon approaches Earth far closer than apparent diameters imply

Precession of equinoxes slower than observed (cumulative error)

Not uniform circular motion along deferent (“philosophic” concern)

Earth not at the center of planetary system (“philosophic” concern)

Account of latitudes not physically realizable (“philosophic” concern)

Shortcomings not emphasized in the literature before the Renaissance

Errors in longitude and latitude > 2 Moon diameters (non-cumulative)

No solution for distances of planets from Earth (“philosophic” concern)

No constraints from one planet orbit on any other (“philosophic” concern)

Centers of deferents do not coincide with one another (“philosophic” concern)

If Ptolemaic science was not such bad science by modern standards, then what, if anything, is it about our current science that assures us that large parts of it are not going to be rejected as fundamentally wrong – and even ridiculed – in the future in just the manner that happened with Ptolemaic science?