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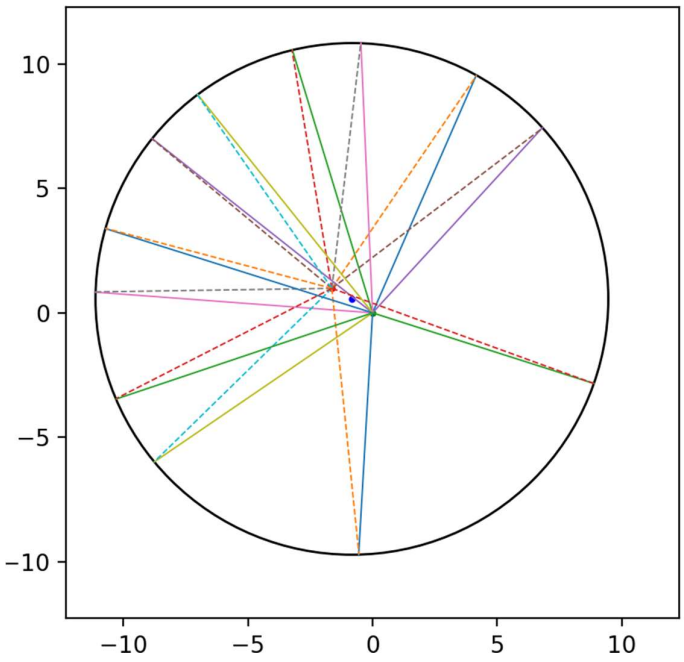
M.Tech Artificial Intelligence

SR No. 17862

Results



Equant: Red
Sun: Green
Center: Blue
Dashed line: Equant Longitudes
Straight line: Heliocentric Longitudes

Parameters	Optimum Values
Center angle (c)	145.887°
Equant distance (e1)	1.906 * sun-center distance
Equant angle wrt equant-0 (e2)	93.05°
Equant-0 (z)	55.87°
Orbit radius (r)	10.28 * sun-center distance
Angular velocity (s)	360/686.918 °/days
Errors	[-0.077, 0.0791, 0.0619, -0.0534, -0.0243, 0.0799, -0.0098, -0.0791, 0.0402, 0.0618, -0.0558, -0.0799]
Maximum error	0.0799°

Initial guess for Orbit radius

Semi-major axis(a) = 1.52400
Semi-minor axis(b) = 1.51740
Eccentricity(e) = 0.093
Data is taken from here: https://en.wikipedia.org/wiki/Semi-major_and_semi-minor_axes#Semi-major_and_semi-minor_axes_of_the_planets'_orbits

Average radius = (a+b)/2 = 1.5207
Focal distance(f) = a*e = 0.141732 (Assuming Sun at Foci)
Scaling radius to unit of focal distance = Average radius / f = **10.6**

Learning & Conclusion

- Using datetime module is important to get Equant longitudes correctly.
- Use conversion between polar to cartesian or vice versa as few as possible. These conversions introduce floating-point errors a lot.