JSO Coordinate System

Isaac Wetton

January 30, 2023

The Jupiter-Sun-Orbit, or JSO, coordinate system, shown in figure 1, is a coordinate system used specifically when taking measurements around Jupiter. The system aligns itself with Jupiter, the Sun, and Jupiter's planetary velocity [1].

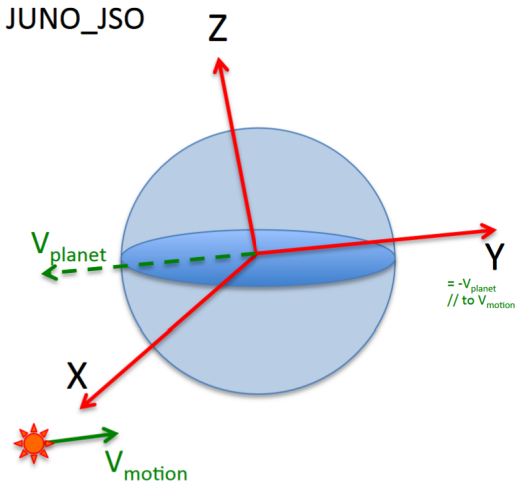

Figure 1: A diagram illustrating the Jupiter-Sun-Orbit coordinate system [1]. The x-direction is aligned with the vector from Jupiter to the Sun, the Y-direction is aligned with the Sun's velocity in Jupiter's frame V_{motion}, and the z-direction is the cross product direction of x and y. The origin of the coordinate system is at the centre of Jupiter.

The X-vector is equal to R_{JS}, the unit vector from Jupiter to the Sun. The Y-vector is aligned with the direction of the Sun's velocity in the frame of Jupiter (i.e. the opposite direction of Jupiter's velocity in the Sun's frame). The Z-vector is in the vector product direction of the X and Y vector directions.

It is important to note that +Z is no longer ecliptic North due to the direction of V_{motion} [1]. Jupiter's orbit is tilted by 1.303° to the ecliptic plane and by 6.09° to the Sun's equator, and Jupiter's spin axis is tilted by 3.13° with respect to its orbital plane.

References

[1] F. Bagenal and R.J. Wilson. Jupiter Coordinate Systems. Retrieved from Laboratory for Atmospheric and Space Physics (LASP), 2016.