

TIME EVOLUTION OF THE ECCENTRICITY  
AND INCLINATION OF SPACE DEBRIS IN  
THE GEOSTATIONARY RING DEPENDING ON  
THE AREA TO MASS RATIO

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We present a study about the time evolution of the eccentricity and inclination of Space Debris located in the Geostationary ring. Due to the position that these orbiters occupy in this space, they are affected mostly by the joint action of disturbing forces such as the nonuniform mass distribution of the Earth (oblateness), the gravitational forces of the Sun and Moon as the third body, and most importantly the solar radiation pressure (SRP), the latter being directly proportional to the area to mass ratio of the space debris.

Through an analytic propagator we estimate the area to mass ratio based on the position in which the space debris is located within the area delimited by the geostationary ring. This method provides a limiting estimate of this parameter, enabling the determination of ephemerides for each space debris and thus obtain a more real orbit for each as a function of time.

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