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A COMMON CALCULATION METHOD FOR EXTERNAL HEAT FLUX ON CONVEX SURFACE OF KEPLERIAN ORBIT

Abstract

External heat flux is very important for thermal design of spacecraft, the external heat flux analysis must be conducted to perform thermal design and determine the worst cases for thermal analysis. A common calculation method for external heat flux on common convex surfaces (such as plane, cylinder, cone, frustum of cone and sphere) of Keplerian orbit is advanced. In this method, the solar heat flux is calculated by analytical method or numerical integration method, while the planet infrared and albedo heat flux is calculated by numerical integration method or random method, and the process can be simplified effectively. Moreover, the transient external heat flux is analyzed based on this method for the above convex surfaces in common attitude (+Z pointing nadir, -Z pointing sun, and yaw). The transient results of the above convex surfaces in +Z pointing nadir attitude based on the method are compared with the results solved by thermal analysis software, and the precision of the method is validated by the comparison.