ANALYSIS OF GEOS PHOTOMETRIC SIGNATURE CLASSIFICATIONS BASED ON OBSERVATIONS OF FOCUSGEO TELESCOPE

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Ground-based optical-electrical observation is the main approach to obtain the Geostationary earth orbit (GEO) targets' optical characteristics. Light curve classification was studied based on the photometry observations of FocusGEO telescope at Lijiang Station from Dec, 2017 to June, 2019. A new classification system was introduced based on the statistical analysis of GEO satellite light curve features. Moreover, for those satellite signatures with an identifiable peak in brightness, the satellites' solar panel pointing offsets was also examined. And the correlation between light curve classification and satellites' bus type was analyzed. Results shows that photometric signatures of 197 GEO satellites can be divided into six classes and each class can be qualitatively explained by the actual satellite structure. Approximately 90% of these satellites appear to belong to three of six different classes. The distribution of offsets ranges from -15° to +15° and is mostly concentrated between -5° and 5°, with a slight positive bias. However, light curve classification has no significant correlation to satellites' bus types, but for the satellites with the same or similar bus types in each class, the light curves resemble each other. The classification system can aid to identify cluster GEO targets and provide basis for anomaly detection and physical characteristics research.