SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
Fixed and Broadcast Services (1)

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THE SEPARATION METHODS AND STATION KEEPING ALGORITHMS FOR MULTI-GEOS COLLOCATION

Abstract

Abstract: Operators of Geo-satellites are increasingly dealing with the managements of maintaining several satellites in a single orbital slot. It's demanded to implement some active collocation separation strategies to safeguard the Geo satellites at the same orbital slot. The principle of collocation separation strategies is leaving the relative distance beyond collision risk with different set of orbit parameters, and making use of the station keeping opportunities to maintain the difference during the mission, to ensure the safety of collocated satellites. This paper provided the detailed mathematical derivations and some numerical examples for multi-GEOS collocation. And established the relationship between the separation distance with uncertainty of OD and the orbital element off-set for each pair of collocated satellites, and put forward new methods to build such relationship to meet with the challenge of putting four GEO satellites in one slot, the algorithm for each satellite to locate the eccentricity and inclination were also given which including how to use longitude, absolute eccentricity, relative eccentricity and the combined eccentricity-inclination separation strategies. The simulations have been carried out to ascertain that the minimal distance could ensure not only the physical separation also the Radio Frequency (RF) separation with this new strategy.