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RESEARCH ON DOPPLER FREQUENCY-SHIFT AND PROPAGATION -DELAY OF POLAR ORBIT
CONSTELLATION SATELLITE BASED ON HPOP

Abstract

The Doppler frequency-shift and propagation delay of low earth orbit satellite signal were difficult estimated for its complex and imprecise force model. The high precision orbit prediction (HPOP) was proposed to be as the satellite perturbed motion model considering the technical parameters and spatial structure of the polar-orbiting constellation satellites. Then estimation mode of Doppler frequency-shift and propagation delay was established through the geometric vector method, which was based on accurate satellite ephemeris orbital parameters and ground receiver latitude, longitude and elevation. The co-simulation results between STK and Matlab shows the effectiveness and universality of the models, and it can provide priori information of the Doppler and delay compensation in satellite communications and positioning services, as well as a certain reference value for fast signal capture, precision tracking and satellite-ground network time synchronization.