

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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RESEARCH ON THE RELATIONSHIP OF PERIODIC BEHAVIORS OF GNSS SATELLITE ORBIT
AND CLOCK OFFSET**Abstract**

Spaceborne atomic clock is one of the key payloads of GNSS satellites. In order to deeply understand the underlying physical mechanism of periodic variations in the GNSS satellite clock offsets, a modified spectral analysis method is proposed and conducted on GNSS orbit elements to find out the possible similarities between orbit and clock. Firstly, Kepler orbit elements is calculated by reference system transform from ECEF(Earth-Centered-Earth-Fixed) coordinates in precise orbit products of IGS-MGEX(International GNSS Service, Multi-GNSS EXperiment); then both orbit elements and clock offset is preprocessed and analyzed by a modified spectral analysis method; finally, similarities and differences of orbit and clock periodic variations was given and analyzed in detail. The result shows that some periodic variations of clocks are related to the orbit height of satellites which indicate that orbit property is the key to understand the periodic variations of clocks. Also some periods (for example, $T=24$ h) are common to all types of satellites which might be proof of internal periodic behaviors of on-board atomic clocks.