

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)
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RESEARCH OF AUTONOMOUS ORBIT DETERMINATION OF NAVIGATION CONSTELLATION
USING SATELLITE-TO-SATELLITE TRACKING DATA**Abstract**

Autonomous navigation of the Global Navigation Satellite System (GNSS) is a new technology. As we know, satellites of GNSS may lose track of the ground tracking system in some special conditions. Satellite constellation of the GNSS should complete orbit determination and time synchronization without ground-based tracking data in this special condition. Several problems of Autonomous orbit determination using only Satellite-to-Satellite Tracking (SST) data will be discussed in this paper. The bias of the state parameters (position and velocity vector of the satellite) can be controlled using only SST when the initial errors of the priori information are not too large and the force errors of orbit dynamical system are also not too large. The result of the orbit determination will not be good if the errors of the priori information are too large. The errors including net rotation will be enlarged because orbit determination using only SST can't determine the net rotation of the whole constellation. The most important force error of the autonomous orbit determination is the solar pressure error. The result of the orbit determination will also not be good if the error of the solar pressure is too large. The proof and numerical computation of the discussion will be presented in this paper.