

Operational Orbit Determination Using GPS Navigation Data

Yoola Hwang, Byoung-Sun Lee, and Jae-Hoon Kim

Communication Satellite Research Group, Electronics and
Telecommunications Research Institute, Daejeon, South Korea,
305-350

Operational orbit determination (OOD) depends on the capability of generating accurate prediction of spacecraft ephemeris in a short period. The predicted ephemeris is used in the operation such as instrument pointing and orbit maneuvers. In this study the orbit prediction problem consists of the estimating diverse arc length orbit using GPS navigation data, the predicted orbit for the next 48 hours, and the fitted 30-hour arc length orbits of double differenced GPS measurements for the predicted 48-hour period. For 24-hour orbit arc length, the predicted orbit difference from truth orbit was 205 meters due to the along-track error. The main error sources for the orbit prediction are solar pressure and atmosphere density for Low Earth Orbiter (LEO) satellite.