

The simulation of lunar gravity field recovery from delta-VLBI observation of Chang'1 and SELENE lunar orbiters

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Abstract To investigate the selenodesy and other lunar sciences, two lunar missions, the SELENE of Japan and Chang'E of China will be launched next year in scheme. As one of the main scientific target, the lunar gravity field anomalies will be determined in unprecedented accuracy with the satellite to satellite tracking mode of SELENE mission. During the mission periods, the main orbiter of SELENE and the lunar satellite of Chang'E will be measured by VLBI technique at the same time. In order to make the advantage of VLBI tracking of these satellites and to decrease effect of systematic error in lunar gravity field recovery, the Delta-VLBI method between two orbiters is considered and suggested in processing the tracking data of the main orbiter of "SELENE" and the lunar satellite of Chang'E. In this paper, the simulation work of using Delta-VLBI between two lunar satellites in lunar gravity field recovery is presented. As comparison, the lunar gravity recovery result based on 1 satellite tracking and the result based on two satellites tracking without Delta-VLBI are obtained and discussed. In the computation we take consideration of influence due to a prior constraint. The results with and without a prior constraint in lunar gravity field recovery are offered separately. The simulation work here will give some reference and will benefit the tracking arrangement and data analysis of SELENE and Chang'E.