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Simulation of realistic SLR observations to optimize tracking scenarios

The goal of this PhD project is to optimize tracking strategies of SLR stations. We will focus on geodetic and GNSS satellites. For this purpose, synthetic SLR observations are needed, that represent the noise characteristic of real measurements as good as possible. Based on the current tracking activities of the SLR stations and quality of present observations synthetic measurements to alternative or additional targets are generated. Thus, the simulation takes into account outage times due to maintenance or weather and clouds and focuses to reproduce specific noise characteristics for stations and targets respectively. A special feature of the simulation tool is that the assumed noise for the measurement from a station i to a satellite k at an epoch t is independent from remaining tracking scenario, i.e., how many and which other satellites the station i is tracking before or after the epoch t. Moreover the noise is reproducible in case of multiple simulation runs. At first we tried to reproduce the observations submitted to the ILRS between January 2013 and December 2015 by generating synthetic measurement for the stations to the targets tracked by the SLR stations. This allows an in-depth comparison of the residual characteristics between the real and simulated measurements. In a further step this simulation tool will be applied to generate synthetic observations that resemble different tracking scenarios by replacing the targets of the SLR stations at those epochs when real measurements exist. The impact of the alternative tracking scenarios on the resulting parameters