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Application of Kalman filtering for the analysis of Intensive sessions

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The VLBI Intensive sessions are one-hour long, usually single-baseline VLBI sessions performed every day in order to estimate UT1-UTC. Due to the small number of observations in these sessions, the latency between observation and results is relatively short, normally a few days. However, the accuracy of the UT1-UTC estimates is significantly lower than expected based on their formal errors. Although the reason for this is not completely understood, it indicates that the results could get better if improved modeling or estimation procedures are applied.

In this contribution, we analyze the Intensive sessions with the newly developed Kalman filter module of our software, VieVS@GFZ, and investigate whether results improve compared to those obtained when applying the classical least squares method for the data analysis. The accuracy is evaluated by comparing the results for UT1-UTC as well as the tropospheric delays with the estimates from 24-hour VLBI sessions on the same days as the Intensives. We study the impact of different stochastic modelling of the estimated parameters, e.g. of the tropospheric delays. Furthermore, we test whether the results could be improved by including tropospheric parameters estimated from GNSS as additional observations in the Kalman filter.

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