

Operational Enhancements and Application of IPPP Toolbox for GNSS Time and Frequency Transfer at the BIPM

Antoine Baudiquez^{1,2}, Baptiste Chupin², Giulio Tagliaferro¹, Pierre Uhrich², Frédéric

Meynadier¹

¹Time Department, BIPM, Sèvres, France

²LNE-SYRTE, Observatoire de Paris, Université PSL, CNRS, Sorbonne Université, Paris, France

Email: antoine.baudiquez@bipm.org

This study explores operational advances and practical applications of the Integer Precise Point Positioning (IPPP) technique for GNSS-based time and frequency transfer within the Bureau International des Poids et Mesures (BIPM) framework. Our objective is to enhance the IPPP toolbox for operational efficiency and user-friendliness, aiming at sharing our software with contributing laboratories. This work is supported by French Labex First-TF.

Our investigation includes refining the IPPP technique by leveraging rapid integer products from the CNES/CLS (GRG) IGS analysis center. Quicker availability of the links is necessary for including them in UTC calculation.

Furthermore, we continue exploring multi-GNSS approaches with GPS and Galileo constellations to broaden IPPP's applications and enable a comprehensive assessment of its performance.

Our comparative analysis scrutinizes IPPP links over extended durations, highlighting challenges in maintaining continuous links over periods up to 200 days. Additionally, we conduct comparative studies with optical fiber links over an 89-day period, assessing performance across diverse receiver configurations.

The evaluation emphasizes time bias, frequency bias, and frequency stability of IPPP solutions, providing insights into their accuracy and operational efficiency. Results encompass a variety of UTC(k) links, ranging from short baselines to long-distance connections across continents, ensuring comprehensive coverage and robustness in our assessment.

Link analysis - PTBB_OP73

