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Satellite track-to-track ambiguity resolution for GNSS dual- and triple-frequency linear combinations

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On the zero-difference level the receiver- and satellite-related biases are the most critical obstacle in ambiguity resolution. It is always difficult to reliably estimate and separate all these receiver- and satellite-related biases that are linearly dependent on the ambiguities. For satellite track-to-track ambiguities, the difference between two ambiguities from one receiver to the same satellite but on two consecutive tracks, all receiver- and satellite-related biases, that are more or less constant in time, will be eliminated. This is a considerable advantage for ambiguity resolution. In recent years, colleages from ESA/ESOC have demonstrated the track-to-track dual-frequency phase clock ambiguity resolution.

We will present the results concerning track-to-track ambiguity resolution using the dual-frequency Melbourne-Wübbena linear combination, the dual-frequency ionosphere-free linear combination, as well as the triple-frequency ionosphere-free and geometry-free linear combinations. The results from simulations and from the processing of real data, stemming from the Multi-GNSS Experiment (MGEX), will be shown. We conclude that the success rate of the track-to-track ambiguity resolution is higher than that of normal ambiguity resolution on the zero-difference level without estimating the biases. We show that, an iterative ambiguity resolution, constraining of the resolved track-to-track ambiguities on the normal equation level, can further improve the results. In addition, special emphasis will be put on the influence of receiver and satellite biases, which depend on the various signal tracking techniques used.