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Current status and future perspectives of VLBI global solutions

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The realization of a terrestrial and celestial reference frame is a fundamental requirement for all ground- and space-based observations, making the interpretation of key global processes on Earth possible and therefore contributing to a better understanding of the Earth system. In this matter, the space-geodetic technique called Very Long Baseline Interferometry (VLBI) provides the perfect link between stations on the Earth's surface and extragalactic sources with a quasi-fixed position. In the process of an intra-technique combination, it is possible to estimate parameters that are common to all VLBI sessions in a common least squares adjustment, resulting in, e.g., catalogs of station and source positions (and station velocities) at a certain reference epoch.

We present the current status of our new state-of-the-art and stand-alone Python software for the combination of VLBI sessions developed at the VLBI Analysis Center in Vienna. The combination process is based on homogenized, datum-free normal equations from SINEX (solution independent exchange format) files. In the future, we are planning on implementing filter solutions to ensure an optimal state estimation of the dynamical system Earth and further expanding the capabilities of our software by, e.g., allowing a combined analysis of different space-geodetic techniques (inter-technique combination) to further improve the consistency and accuracy of the resulting reference frames and Earth Rotation Parameters (ERPs).