Scaling Individual VLBI Solutions by Variance Component Estimation for Intra-technique Combination

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In intra-technique combination we combine the same type of observations which
sometimes have different quality due to different analysis strategies and parametriza-
tion of the individual solutions. Thus, the various solutions have to be scaled against
each other. The respective scale factors of individual solutions can be estimated within
the general combination model. This can be performed by variance component es-
timation (vce). In this study, individual VLBI (Very Long Baseline Interferometry)
solutions in the year 2002 have been chosen for intra-technique combination on nor-
mal equation level. Scaling factors of normal equations were calculated from both,
variance component estimation and traces of individual normal equation matrices. For
the first part of the study, those Analysis Centers (AC) were chosen, which use dif-
ferent software and different prior information, but the same anaysis strategies. The
results show that combination with vce provides the best results. In a further inves-
tigation, the other AC solutions (e.g., MAO-Main Astronomical Observatory, IAA-
Institute of Applied Astronomy) which use different analysis strategies were taken.
We present a combination methodology in the Bayesian framework using weighted
Normal-Wishart priors. All combination procedures have been done with a MATLAB
based software developed at the Institute of Geodesy and Geophysics, Vienna.