The API contribution to the IERS-CPP activities

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Introduction

The API (ASI, PoliMi, INGV) consortium is developing a procedure to rigorously combine weekly inter-technique geodetic solutions. The API agreement foresees a joint effort between three research institutes (the Matera Space Geodesy Center, ASI; the Politecnico di Milano, PoliMi and the Istituto Nazionale di Geofisica e Vulcanologia, INGV) and a private owned company (Telespazio SpA) to design, to implement and to maintain the procedures for the rigorous combination of geodetic solutions. Starting from the ASI expertise gained in the SLR SINEX combination pilot project, an open group of researchers has been formed with the aim of studying different combination methods and to maintain and operate the weekly combination process. The original SLR combination software tools have been generalized to the inter-technique combination problem, applying the full covariance of the local ties and handling cumulative combined solutions.

Present status

The current precedure foresees the loosely constraint approach that implicitly assumes as input the loosely constraint (1 m) geodetic solutions, not necessarily expressed in the same reference frame. The procedure is now in a testing phase, a number of issues and problems has been fixed and preliminary results are encouraging: combing GPS, SLR and DORIS solutions, the combined product exhibits a global 3-D wrms of about 15 mm and 0.1 mas with respect to the ITRF2000 and EOP-C04 references. The current VLBI solutions contain the normals, which has not yet been included in the combination process and therefore do not contribute in this phase.

Future plans

Combination including the VLBI solutions and assessment of the current VLBI solutions (unconstrained normal equations).

Correct handling and monitoring of the EOP parameters as estimated from the different techniques and ensure an efficient combination.

Implement a statistical significance test on the combination process and a quality assessment procedure, in order to detect anomalies.