



Recursive GPS velocity field

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We implemented an iterative method to compute an estimate of the velocity field of a GPS network by adding recursively the station coordinates.

The velocity field is obtained as the solution of the restricted least square problem. At each epoch t_i for which we have observations x_{t_i} with covariance matrix Σ_{t_i} , we estimate, via a least square approximation, the velocity field of the entire network upgrading the *a priori* velocity field calculated at the epoch t_{i-1} . In this way we obtain an updated velocity field for each epoch leading to a velocity time series that may be useful for a rough estimation of new site velocities and for the study of the station velocity stability.

To validate this method, we compare the recursive velocity field of a network of 65 GPS sites, with the velocity field obtained fitting all observations at once in a standard way. The test solutions, obtained with the Bernese software, cover a time span of 3 years (2007-2008-2009) and the two estimated velocity fields agree at the level of 0.05 mm/yr.