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Interpolating a velocity field using Multilevel B-Splines

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The estimation of regular velocity fields from irregular distributed GPS stations corresponds to the problem of scattered data approximation with free form surfaces. The method of Multilevel B-Spline Approximation is a powerful tool to solve this problem. The iterative evaluation of approximation surfaces leads to a best fit approximation of the station velocities. The algorithm for the Multilevel B-Spline Approximation has to be extended by the methods of error propagation to evaluate statistically the quality of the interpolated velocity field.

Multilevel B-Spline Approximation is applied to generate a velocity field based on roughly 40 GPS stations in Romania. The investigation area includes several CEGRN stations, campaign stations in the framework of the Collaborative Research Center 461 “Strong Earthquakes” and a few permanent GPS stations.

The main focus is to introduce shortly the approximation algorithm and to present and to discuss the obtained results for the velocity field.