



Approximation and Inversion of Potential Fields in Gravitation and Geomagnetism via the ROFMP

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In the analysis of potential field data, the choice of a suitable system of trial functions is a crucial task. As a greedy algorithm, the presented Regularized Orthogonal Functional Matching Pursuit (ROFMP, developed by the first author during his time at the Geomathematics Group at the University of Siegen) is able to combine arbitrary trial functions for the approximation or inversion of the data. The functions are iteratively picked out of a particularly chosen dictionary which may consist of various types of functions. Hence, it is possible to tailor particular dictionaries for different applications. For example, we can combine spherical harmonics as well as several localized basis functions for a (sparse) downward continuation of scalar gravitational data. By considering appropriate time-periodic trial functions, for instance, we are able to extract periodic tidal signals out of vector-valued geomagnetic field data.