Advancements for gravity field modelling using learning techniques

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Visualization of the Earth's gravitational potential as well as its seasonal variation is an important tool to learn about the Earth and the climate change. One strategy to approximate the potential, also from satellite height, is via building a linear combination of local and global trial functions from a dictionary. For instance, we can use spherical harmonics and radial basis functions (RBFs). This strategy is implemented by the (Regularized) Functional Matching Pursuit ((R)FMP) and variants of it.

However, one core question is to develop an approach to determine an optimized finite dictionary from the infinite set of possible trial functions. We present an iterative learning strategy for global and local trial functions. The learning algorithm includes non-linear constrained optimization techniques. We explain the details of our approach and show numerical examples.