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Design and analysis of anisotropic low-pass filters on the sphere

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Filtering data on the sphere has been in the reckoning of late, due to its requirement in the post-processing of GRACE data. This has led to the design/re-discovery of a variety of low-pass filters on the sphere. In this contribution, we first explore the possibilities in the design of low-pass filters and classify them based on their local and global properties: the local property being *isotropy* and the global property is *homogeneity*. The classification yields six different types of filters, which are a result of the permutations and combinations of the local and global properties. Few of the filters that have been prevalently used in the GRACE community are subjected to performance analysis based on a set of performance measures. These measures, based on the energy functional of the filter and the field being filtered, demonstrate the abilities of the filter both qualitatively and quantitatively. While the performance measures provide very good insight into the filters, they also clearly show that inter-comparison of different anisotropic filters is difficult.