Modified radial basis function partition of unity method for solving problems in applications

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The Partition of Unity Method (PUM) combined with Radial Basis Functions (RBFs) is known to be a computational technique, which enables one to efficiently and accurately solve big interpolation and differential problems [5, 3, 4]. Basically, the idea of PUM is to decompose the domain into a number of subdomains (or patches) forming a covering of it and constructing then a local RBF approximant on each of these subdomains. Generally, if we have to deal with quite uniform or regular data, a standard RBF-PUM interpolation scheme can effectively work with hyperspherical subdomains (balls) of fixed radius [1]. When data are instead non uniform or very irregularly distributed, we need a method that allows us to automatically select subdomains of variable radius and isotropic RBF interpolants with optimal shape parameters [2]. Here we propose some modifications to numerically solve interpolation problems on particular data sets and elliptic PDEs. Some numerical experiments are presented.

Joint work with: A. De Rossi.

References

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