

Kernel--Based Meshless Methods for Solving PDEs

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Abstract

This survey starts from general kernels, but soon focuses on the special use of kernels in meshless methods. Kernels provide particular and fundamental solutions, and lead to efficient meshless methods without numerical integration. They allow error bounds and convergence results for unsymmetric methods like the MLPG, and if time permits, the underlying theory will be reviewed, together with a recent extension to nonlinear problems. Finally, certain singularity--free harmonic kernels in 2D and 3D will be presented. They reduce the solution of potential problems to a simple interpolation on the boundary and allow a rigid mathematical analysis.