

Kernel-Based Approximation Method for Medical Imaging Problems

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In this talk we present the development of meshless computational method based on the use of kernel-based functions for solving various physical problems. Properties of some special kernels such as radial basis functions; harmonic kernels; fundamental and particular solutions will be discussed. For tackling the well-known ill-conditioned resultant system of equations, the method has recently been localized so that application to large scale engineering and industrial problems is now feasible. The method requires only a set of nodes in the domain and on the boundary from which all governing equations are solved in strong formulation without the need of tedious integrations. The refinement and redistribution of the nodes in adaption to moving boundary or rapid changing gradients in field variables can efficiently be made. The method is proven to be efficient; accurate; and easy to code. For application to medical imaging problems related to liver transplantation, we will present some recent experimental case studies with real data from several hospitals.

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