

1154-65-494

Yue Cao and **Shuwang Li***, 10 W. 32nd St., Room 220, Chicago, IL 60616. *A kernel-free boundary integral method for boundary value and interface problems in doubly-connected domain.* Preliminary report.

In this talk, we propose a kernel-free boundary integral method (KFBIM) for variable coefficients partial differential equations (PDEs) defined in a doubly-connected domain. We are interested in boundary value problems (BVP) and interface problems. Without requiring the analytical form of the Green's function, the KFBIM computes boundary or volume integrals by equivalently solving an interface problem on Cartesian mesh in the finite difference framework. The coupled integral equations are then solved using a Krylov subspace iterative method. The method is second order accurate in space, and its complexity is linearly proportional to mesh node number. Numerical examples show the method is robust for variable coefficients PDEs with large diffusion coefficients ratio. (Received September 05, 2019)