**A second order accurate boundary condition capture method in irregular domain** ZHIPENG QIN, AMIR RIAZ, Univ of Maryland-College Park — A robust second order accurate method is presented to solve the variable coefficient Poisson's equation. One kind of volume fraction weight is used to separate different phases. This second order boundary condition capture method preserves the jumps of the function and its direction across the interface by a defined correction term. Similar to Ghost Fluid Method, the new method is implemented using a standard finite different discretization on a Cartesian grid. Therefore, it could be extended to three spatial dimensions for the case of moving interface more easily than existing methods. Furthermore, the coefficient matrix of the linear system is symmetric for the variable coefficient Poisson's equation. It is expected to be applied for Navier-Stoke's equation solver, ie, without the need of additional sources.

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