Armando Coco

**Second Order Multigrid Methods for Elliptic Problems
with Discontinuous Coefficients on an Arbitrary Interface**

Via Procida
54
96012 Avola (SR)
Italy
coco@dmi.unict.it
Giovanni Russo

In this talk we present a multigrid second order accurate method to solve Elliptic equations with discontinuous coefficients on an arbitrary interface. Second order accuracy for the gradient derivative is obtained as well. The method is based on the Ghost Fluid Method, making use of ghost points on which the value is defined by suitable interface conditions. The multi-domain formulation is adopted, where the problem is split in two sub-problems and interface conditions will be enforced to close the problem. Interface conditions are relaxed together with the internal equations, leading to an iterative method on all the set of grid values (inside points and ghost points). A multigrid approach with a suitable definition of the restriction operator is provided. The restriction of the defect is performed separately for both sub-problems, providing a convergence factor close to the one measured in the case of smooth coefficient and independent on the magnitude of the jump in the coefficient. Numerical tests will confirm the second order accuracy.