1046-35-1374 **August Johansson*** (august.johansson@math.umu.se), Department of Mathematics, Umea University, SE-901 87, Umea, Sweden. *A Finite Element Method for Implicit Interface Problems.*

Interface problems involve differential equations containing discontinuous data and solutions across some interface. If the interface evolves it is desirable to be able to track it without remeshing. Here, we present a finite element method for handling elliptic problems where discontinuous coefficients and singular sources are the causes of jumps in the solution or in its normal derivative. A level set formulation is used for the representation of the interface. The method is general in the sense that there is no special consideration to be made regarding dimension or element type.

The method was first developed by Huh and Sethian for 2D static problems. It relies on constructing correction functions corresponding to the prescribed jumps. In the case of constant coefficients, implementation is facilitated by the result that the corrections only appear in the right hand side of the equation. In this paper, we extend the method to three dimensions, and couple it to moving interface problems under complex physics. This is illustrated in a three-dimensional combustion problem on a hexahedral mesh. By allowing for discontinuous coefficients, the method is generalized to a fully nonconforming finite element method. (Received September 15, 2008)