1086-65-1809 **Holger Heumann*** (hheumann@unice.fr), LJAD, Université de Nice - Sophia Antipolis, Parc Valrose, 06100 Nice, France. *Hyperbolic Problems with Involutions and Discrete Differential Forms.*

A linear, first order differential equation with homogeneous righthand side is an *involution* of some given hyperbolic conservation law if both equations have the same solution. Very often, the involution is considered to be a very important geometric stucture of the conservation law, for instance the vanishing divergence of the magnetic field for Maxwell equations. As a consequence, much effort has been devoted to devising finite volume schemes that compute numerical solutions that are, at least approximatively, solution of some discrete version of the involution as well.

If, as for the Maxwell equations, the differential operator of the involution is an exterior derivative, we could simply use discrete differential forms for the discretization of the conservation laws. Then the solution fulfills the involution exactly. But, the non-standard localization of the degrees of freedom of discrete differential forms are a considerable obstruction for the extension of existing finite volume codes. We would like to illuminate how the framework of discrete differential forms can nevertheless help to devise finite volume schemes for which a corresponding *discrete involution* follows naturally. (Received September 24, 2012)