Meeting: 1003, Atlanta, Georgia, SIAMMINI 2, SIAM Minisymposium on Discontinuous Galerkin Methods: Theory and Applications

1003-65-736 **Fengyan Li*** (fli@math.sc.edu), 1523 Greene Street, Columbia, SC 29208, and **Chi-Wang Shu**. *The locally divergence-free discontinuous Galerkin methods.*

There are many partial differential equations with solutions which have divergence-free components. Examples include the incompressible Euler and Navier-Stokes equations, the magnetohydrodynamics (MHD) equations and the Maxwell equations. For some of the problems, such as the MHD equations and the Maxwell equations, the divergence constraint seems to be redundant, as in the continuous model, the solutions will automatically satisfy the divergence-free condition if the initial data is divergence-free. However, many works in literature show that the actual negligence in dealing with the divergence-free condition numerically can lead to serious defects of the schemes.

Motivated by this, the locally divergence-free discontinuous Galerkin Methods are developed here and the capabilities of the methods are explored through the theoretical and numerical studies. (Received September 28, 2004)