

**Meeting:** 1002, Pittsburgh, Pennsylvania, SS 4A, Special Session on Partial Differential Equations and Applications

1002-35-65      **Helge Kristian Jenssen\*** (hkjensse@ncsu.edu), Department of Mathematics, North Carolina State University, 255 Harrelson Hall, Box 8205, Raleigh, NC 27695. *BV instability for Godunov and Lax-Friedrich schemes.*

We construct a solution to a  $2 \times 2$  strictly hyperbolic system of conservation laws, showing that the Godunov scheme can produce an arbitrarily large amount of oscillations. This happens when the speed of a shock is close to rational, inducing a resonance with the grid. Differently from the Glimm scheme or the vanishing viscosity method, for systems of conservation laws our counterexample indicates that no a priori BV bounds or  $L^1$  stability estimates can in general be valid for finite difference schemes.

We also give an explicit example showing that discrete shock profiles do not depend continuously in BV on their speed. (Received August 21, 2004)