1100-35-31 **David S Gilliam*** (david.gilliam@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Box 41042, Lubbock, TX 79409, and **Edward Allen** (edward.allen@ttu.edu) and **John A Burns** (jaburns@vt.edu). *Incorrect Convergence of Computational Solutions for a Burgers' Problem.*

A simple example for Burgers equation is used to illustrate that even theoretically convergent numerical schemes can produce numerical steady state solutions that do not correspond to steady state solutions of the boundary value problem. This phenomenon should be considered in any computational study of non-unique solutions to partial differential equations that govern physical systems such as fluid flows. The erroneous solutions arise from the use of finite floating point arithmetic which is inherent in every digital computer. We claim that the erroneous solutions are actually real solutions of a "nearby" boundary value problem containing a nonzero parameter which is considered zero in a finite floating point number system on a computer. (Received January 15, 2014)