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Coauthors: Clarence O. E. Burg

A NUMERICAL SOLVER FOR BUGERS EQUATIONS IN TWO DIMENSIONS

ETHAN ALAN HERETH

In this presentation we introduce a numerical partial differential equation solver of the following system of Burgers' equations:

$\partial u/\partial t = \lambda_1 \left(\partial^2 u/\partial x^2 + \partial^2 u/\partial y^2\right) + u\left(\partial u/\partial x + \partial u/\partial y\right) + f_1(u,v)\partial v/\partial x + f_2(u,v)\partial v/\partial y$

$\partial v/\partial t = \lambda_2 \left(\partial^2 v/\partial x^2 + \partial^2 v/\partial y^2\right) + v\left(\partial v/\partial x + \partial v/\partial y\right) + g_1(u,v)\partial u/\partial x + g_2(u,v)\partial u/\partial y$

where the λ_is are constants that scale the diffusivity exhibited by the system, while the f_is and g_is are source terms. This code was tested on a decoupled case involving only the convective terms, a decoupled case with diffusion and a case where the system is coupled by setting the f_is and g_is to 1.

University of Central Arkansas
E-mail address: eah03001@uca.edu