Meeting: 1007, Santa Barbara, California, AMS CP 1, Session for Contributed Papers

1007-76-73 **Roy B. Leipnik*** (leipnik@math.ucsb.edu), Mathematics Dept., UCSB, Santa Barbara, CA 93106. *Reduction of Media-interactive Flow Equations of Burgers Type to Driven Diffusion Equations.*

A model of viscous flow in a variably (in space and time) interactive one-dimensional medium, of generalized Burgers type, is reduced, by a generalized Hopf-Cole transformation, to a driven diffusion. The usual convective term, flow multiplied by flow gradient, is replaced by a linear functional of the flow with time and space-variable parameters multiplied by flow gradient. An external force is allowed. A Hopf-Cole transformation of the form: old flow velocity is a linear functional of the new flow velocity gradient, converts the generalized convection equation to a driven diffusion equation. Three types of transformation are found to be effective: the original (reciprocal) type, a trigonometric type, and a hyperbolic function type. The various coefficients involved in the transform depend on the original variable parameters, through (solved) ordinary differential equations. The applications are to viscous flow in thin tubes with surface or fluid irregularities in time or space, such as pulsatile flow of blood with cells in arteries. The special case of an external force only is pursued in detail, as a simple extension of Hopf-Cole. (Received February 02, 2005)