

1027-35-181

Diane L. Denny* (diane.denny@tamucc.edu), Department of Mathematics and Statistics,
Texas A&M University - Corpus Christi, 6300 Ocean Drive, Unit 5825, Corpus Christi, TX 78412.
*Existence and uniqueness of solutions to equations modeling compressible fluid flow with capillary
stress effects.* Preliminary report.

We consider the initial-value problem for a system of nonlinear equations which models the multi-dimensional flow of a compressible fluid, and which includes capillary stress effects. The model is applied to fluid flow near the liquid-vapor critical point. The system includes evolution equations for the density, temperature, and velocity, and an equation of state for the pressure. We prove the global-in-time existence of a unique solution to these equations under periodic boundary conditions. The key to the proof is a new a priori estimate for the divergence of velocity. (Received February 26, 2007)