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Andrea Corli (andrea.corli@unife.it), Via Machiavelli, 35 - 44100, Ferrara, Italy, and
Haitao Fan*, Department of Mathematics, 37 & O St. NW, Washington, DC 20057. *Phase
Transitions for Laminar-Turbulent Flow in a Pipeline or through Porous Media.*

Phase changes in a fluid flow through a porous medium or a pipeline are considered. In particular, the model covers both laminar and turbulent flows. The presence of both laminar and turbulent flows causes jump discontinuities in the friction coefficient. Classical trajectories of traveling waves terminate when they intersect the discontinuity. We construct traveling wave solutions by monotonically smoothing the discontinuity and then taking a limiting process. The limit is independent of the monotone-preserving smoothing. This uniqueness justifies the construction of the traveling wave via this smoothing and limiting approach. Existence of traveling waves is established in a wide range of situations; in particular, the end states may be formed either by pure phases or mixtures. (Received January 19, 2015)