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*A HYPERBOLIC SYSTEM OF CONSERVATION LAWS FOR FLUID FLOWS THROUGH COMPLIANT AXISYMMETRIC VESSELS.*

We are concerned with the derivation and analysis of one-dimensional hyperbolic systems of conservation laws modelling fluid flows such as the blood flow through compliant axisymmetric vessels. Early models derived are nonconservative and/or nonhomogeneous with measure source terms, which are endowed with infinitely many Riemann solutions for some Riemann data. We derive a one-dimensional hyperbolic system that is conservative and homogeneous. Moreover, there exists a unique global Riemann solution for the Riemann problem for two vessels with arbitrarily large Riemann data, under a natural stability entropy criterion. The Riemann solutions may consist of four waves for some cases. The system can also be written as a  $3 \times 3$  system for which strict hyperbolicity fails and the standing waves can be regarded as the contact discontinuities corresponding to the second family with zero eigenvalue. (Received February 15, 2010)