1030-35-296 **Wei H Ruan*** (ruanw@calumet.purdue.edu), Department of Mathematics, Computer Science, and Statistics, Purdue University Calumet, Hammond, IL 46323. *A Coupled System of ODEs and Quasilinear Hyperbolic PDEs Arising in a Multiscale Blood Flow Model.*

We study a coupled system of ordinary differential equations and quasilinear hyperbolic partial differential equations that models a blood circulatory system in the human body. The mathematical system is a multiscale model in which a part of the system, where the flow can be regarded as Newtonian and homogeneous, and the vessels are long and large, is modeled by a set of hyperbolic PDEs in a one-spatial-dimensional network, and in the other part, where either vessels are too thin or the flow pattern is too complicated (such as in the heart), the flow is modeled as a lumped element by a set of ordinary differential equations as an analog of an electric circuit. The mathematical system consists of pairs of PDEs, one pair for each vessel, coupled at each junction through a system of ODEs. This model is a generalization of the widely studied models of arterial networks. We give a proof of the well-posedness of the initial-boundary value problem by showing that the classical solution exists, is unique, and depends continuously on initial, boundary and forcing functions and their derivatives. (Received August 06, 2007)