
ANALYSIS OF NETWORKED FIRST-ORDER HYPERBOLIC SYSTEMS OF FLUID FLOW

Mapundi Kondwani Banda

First-order hyperbolic systems are used to model different phenomena such as gas flow, shallow water flow, blood flow in arteries and veins, as well as multi-phase flow. Such flow can be complicated due to the fact that in interesting nonlinear cases the requisite solutions of Riemann problems may be discontinuous and weak solutions are considered. To identify physically relevant solutions, an entropy condition is employed. These ideas are extended to flows in a networked domain. In such domains different simple domains are coupled at nodes of the network. At nodes half-Riemann problems are solved and well-posedness is proved. Numerical approaches with appropriate boundary conditions at the nodes or vertices of the network are discussed.

Mapundi Kondwani Banda, Department of Mathematics and Applied Mathematics, University of Pretoria, South Africa

e-mail : `mapundi.banda@up.ac.za`
