1023-35-278 **Michael Herty*** (herty@mathematik.uni-kl.de), PO Box 3049, 67653 Kaiserslautern, Germany. *Existence of solutions to nonlinear hyperbolic equations arising in gas dynamics in pipe networks.*

We are interested in gas flow in pipe networks. Several models for the dynamics inside the pipe are known which range from partial differential equations to purely algebraic relations. Usually, the dynamics of different pipes is coupled at pipe fittings and we discuss the mathematical and physical reasonable coupling conditions. We are interested in questions of well-posedness and existence of solutions near pipe fittings for models based on the nonlinear hyperbolic partial differential equations which are derived from the Euler equations. The problem at hand is an initial and boundary value problem for a system of nonlinear conservation laws coupled by the conditions introduced by the pipe fitting. We prove existence and uniqueness of solutions to these coupled problem. The applied techniques are based on considerations on special Riemann problems posed at the pipe fitting. The method presented is therefore not limited to gas dynamics but can also be applied to traffic flow problems or shallow water equations. Finally, we present numerical examples showing the dynamics on the pipe and at the pipe fitting. (Received September 02, 2006)