

AME 598t  
Prof. J. M. Powers  
Homework 12  
Due: Tuesday 26 April 2005

Consider the one-dimensional analog of the model given by Powers and Gonthier.<sup>1</sup> Use as a starting point Equations (1-8) taking  $v = 0$ , and take all parametric constants to be those given in the paper.

- Reproduce the scaling arguments to get the proper one-dimensional analog of Equations (12-17).
- Select a wavespeed which generates an eigenvalue detonation. For this wavespeed, numerically determine and plot  $\lambda_1(x)$ ,  $\lambda_2(x)$ ,  $P(x)$ ,  $\rho(x)$ ,  $u(x)$ , and  $M^2(x)$ .

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<sup>1</sup>Powers and Gonthier, 1992, "Reaction zone structure for strong, weak overdriven, and weak underdriven oblique detonations," *Physics of Fluids A*, Vol. 9, pp. 2082-2089.