INTRODUCTION

In detonation wave computations involving curved detonation fronts, accurate solutions can be obtained by resolving the reaction zone. That is, the partial differential equations for mass, momentum and energy can be solved at each time step on a fine grid. However, using fine grids in the reaction zone requires small time steps and leads to expensive computations. Thus, it is desirable to compute solutions to detonation problems without numerically resolving the reaction zone.

For planar detonation waves, algebraic jump conditions which do not depend on the dynamics within the reaction zone can be used to compute the burned Hugoniot and wave curves. One can then solve the Riemann problem. Solving differential equations through the reaction zone is avoided. There is a one parameter family of physical behind states to which an ahead state may be connected by a planar detonation. The behind states can be parameterized by the detonation velocity. The Random Choice[1-3] and Front Tracking[4-6] Methods have been applied to detonation problems[7-9] taking advantage of these jump conditions.

For curved detonations, the state at the end of the reaction zone depends on both the detonation velocity and the curvature of the wave. Recently, curved detonation jump conditions have been derived[10]. However, these jump conditions contain two "source terms" which involve front curvature, reaction zone length and integrals of physical quantities in the reaction zone.

We parameterize the source terms by the detonation velocity and curvature. The source terms are linear in curvature, κ, and an exponential fit vs. detonation velocity is used. We show how the curved detonation jump conditions can be solved to compute the curved detonation Hugoniot. By finding the Hugoniot (and the related

wave curve),