

# TITLE OF THE PAPER TITLE OF THE PAPER TITLE OF THE PAPER

Yu Xingchun

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## Abstract

## 1 Riemann Problem

The reactive Euler equations in one-dimensional space can be written as the Euler Equations plus a chemical reaction term, i.e.,

$$\partial_t \mathbf{U} + \partial_x \mathbf{F}(\mathbf{U}) = \mathbf{S}(\mathbf{U}), \quad (1)$$

with

$$\mathbf{U} = \begin{bmatrix} \rho \\ \rho u \\ E \\ \rho \lambda \end{bmatrix}, \quad \mathbf{F} = \begin{bmatrix} \rho u \\ \rho u^2 + p \\ (E + p)u \\ \rho u \lambda \end{bmatrix}, \quad \mathbf{S} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ \rho \lambda K \end{bmatrix}. \quad (2)$$

## 2 Combustion Waves

### 2.1 Detonation Waves

### 2.2 Deflagration Waves

## 3 Equations for Pressure and Velocity

## 4 Numerical Solution for Pressure

## 5 The Complete Solution

[1]

## References

- [1] Xiaowu Lu and Rudolf Schmid. A numerical study of the Riemann solutions for gasdynamic combustion. *Applied Mathematics and Computation*, 91(2-3):143–160, May 1998.