Electronic Journal: Southwest Journal of Pure and Applied Mathematics
Internet: http://rattler.cameron.edu/swjpam.html
ISSN 1083-0464
Vol. No. 01, 1997, pp. 1–7.
Submitted: November 15, 1996. Published: April 29, 1997.

NUMERICAL STUDY OF FLAME PROPAGATION IN BOUNDARY LAYERS

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Abstract. An incompressible, reactive, viscous flow reaches a hot circular cylinder causing a reaction to start. We observe the progress of the reaction, concentrating in the transition towards turbulence within the boundary layer. The problem is divided into the fluid dynamics effects and the combustion effects. The motion of the flow is resolved by the use of a hybrid vortex algorithm; the reactive part of the problem is modeled by a combination of a temperature equation and a flame advection and propagation algorithm that mimics Huyghens' principle. The following paper will explain these methods, how to implement them, and will present the numerical results of the experiment.

(1991) A.M.S. Subject Classification Codes. 76D05, 76M25.

Key Words and Phrases. Fluid Dynamics, Reactive Flows, Navier-Stokes Equations, Vortex Methods.

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