**Bifurcation and Stability Theory with Application to Problems of Combustion and Flame Propagation**

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**KEY WORDS (CONTINUE ON REVERSE SIDE IF NECESSARY AND IDENTIFY BY BLOCK NUMBER)**

Bifurcation, stability combustion; transition from laminar to turbulent flame propagation

**ABSTRACT (CONTINUE ON REVERSE SIDE IF NECESSARY AND IDENTIFY BY BLOCK NUMBER)**

We have carried out a research program in Bifurcation and Stability Theory with applications to Combustion and Flame Propagation, in which we determined both qualitative and quantitative behavior of solutions of these problems. In particular we obtained results on the transition from laminar to turbulent combustion. In our study we derived various simplified models from the general equations governing combustion, which were more amenable to mathematical analysis. The methods of bifurcation and stability were then employed on the resulting models.
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LIST OF SCIENTIFIC PERSONNEL

Principal Investigator — Prof. B. J. Matkowsky

Associate Investigators — Prof. T. Erneux
    Prof. A. van Harten
    Prof. A. K. Kapila
    Prof. M. Matalon
    Prof. G. I. Sivashinsky

Student — D. O. Olagunju — received Ph.D.
    Thesis title — "Bifurcation and Stability of Propagating Oscillatory Flames"
LIST OF PUBLICATIONS ON A.R.O. GRANT


"Flames in Fluids: Their Interaction and Stability, accepted for publication, Combustion Science and Technology (with M. Matalon).

"Nonlinear Stability and Bifurcation in the Transition from Laminar to Turbulent Flame Propagation," accepted for publication, Combustion Science and Technology (with S. B. Margolis).


"Thermal Activation From the Fluxoid and the Voltage States of DC-Squids," accepted for publication J. Applied Physics (with E. Ben-Jacob, D. J. Bergman, Y. Imry and Z. Schuss).


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