

REPORT DOCUMENTATION PAGE

AD-A206 336

2b. DECLASSIFICATION/DOWNGRADING SCHEDULE		1b. RESTRICTIVE MARKINGS	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)		3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution unlimited.	
6a. NAME OF PERFORMING ORGANIZATION Princeton University		5. MONITORING ORGANIZATION REPORT NUMBER(S) ARO 22943.12-MA	
6b. OFFICE SYMBOL (if applicable)		7a. NAME OF MONITORING ORGANIZATION U. S. Army Research Office	
6c. ADDRESS (City, State, and ZIP Code) Princeton, NJ 08544		7b. ADDRESS (City, State, and ZIP Code) P. O. Box 12211 Research Triangle Park, NC 27709-2211	
8a. NAME OF FUNDING/SPONSORING ORGANIZATION U. S. Army Research Office		9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER DAAL03-86-K-0003	
8b. OFFICE SYMBOL (if applicable)		10. SOURCE OF FUNDING NUMBERS	
8c. ADDRESS (City, State, and ZIP Code) P. O. Box 12211 Research Triangle Park, NC 27709-2211		PROGRAM ELEMENT NO.	PROJECT NO.
		TASK NO.	WORK UNIT ACCESSION NO.
11. TITLE (Include Security Classification) Mathematical Analysis of Strong Fluid Mechanical Effects in Reacting and Nonreacting Gases			
12. PERSONAL AUTHOR(S) Andrew J. Majda			
13a. TYPE OF REPORT Final	13b. TIME COVERED FROM 10/1/85 TO 12/31/88	14. DATE OF REPORT (Year, Month, Day) 1/13/89	15. PAGE COUNT 2
16. SUPPLEMENTARY NOTATION The view, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.			
17. COSATI CODES		18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)	
FIELD	GROUP	SUB-GROUP	
19. ABSTRACT (Continue on reverse if necessary and identify by block number)			
<p>> The following topics have been studied during this three year period:</p> <ul style="list-style-type: none"> 1) Numerical Modelling of Initiation and Detonation Wave Stability in Multi-D; 2) Enhanced Combustion through Nonlinear Wave Interaction; and 3) New Criteria to Predict Regular Spacing of Reacting Mach Stems. 			
20. DISTRIBUTION/AVAILABILITY OF ABSTRACT <input type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT. <input type="checkbox"/> DTIC USERS		21. ABSTRACT SECURITY CLASSIFICATION Unclassified	
22a. NAME OF RESPONSIBLE INDIVIDUAL		22b. TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL

IC
ELECTE
MAR 22 1989
S H D

①
FINAL TECHNICAL REPORT

ARMY CONTRACT DAAL03-86-K-0003

AT PRINCETON UNIVERSITY

10/1/85 - 9/30/88

↪ This report covers the period October 1, 1985 through September 30, 1988, the three year period of this grant. The research performed under this grant includes mathematical analysis of strong fluid mechanical effects in reacting and nonreacting gases. → see #1473 (previous page).

The principal investigator has published the following papers with at least partial support by this research grant:

1. Fractional Step Methods for Reacting Shock Waves (with P. Colella and V. Roytburd). S.I.A.M./A.M.S. Applied Math. Series. Lectures in Appl. Math., Vol. 24, 1986, pp. 459-477.
2. High Mach Number Combustion. Lectures in Appl. Math., Vol. 24, 1986, pp. 109-184.
3. Nonlinear Geometric Optics for Hyperbolic Systems of Conservation Laws. I.M.A. Symposium on Oscillations, Vol. #2 I.M.A. Series, Springer, 1986, 51 pages.
4. Theoretical and Numerical Wave Structure for Reacting Shock Waves (with P. Colella and V. Roytburd). S.I.A.M. J. Sci. Stat. Comp., Vol. 7, No. 4, 1986, pp. 1059-1080.
5. Vorticity and the Mathematical Theory of Incompressible Flow. Comm. Pure Appl. Math., Vol. 39, 1986, 46 pages.
6. Resonantly Interacting Weakly Nonlinear Hyperbolic Waves. II Several Space Variables (with J.K. Hunter and R. Rosales). Studies in Appl. Math., Vol. 75, 1986, pp. 187-226.
7. Criteria for regular spacing of reacting Mach stems. Proc. Natl. Acad. Sci. USA, Vol. 84, Sept. 1987, pp. 6011-6014.
8. Nonlinear Development of Instabilities in Supersonic Vortex Sheets (with M. Artola), Physica 28D, 1987, pp. 253-281.
9. Nonlinear Mean Field-High Frequency Wave Interactions in the Induction Zone (with R. Rosales). S.I.A.M. J. Appl. Math., Vol. 47, No. 5, 1987, pp. 1017-1039.

10. Nonlinear Geometric Optics for Hyperbolic Mixed Problems. Analyse Mathematique et Applications, Gauthier-Villars, Paris, 1988, pp. 319-356.
11. Numerical Modelling of the initiation of Reacting Shock Waves (with V. Roytburd). I.M.A. Volumes in Math. and Applications, Vol. 12, 1988, pp.195-218.
12. Nonlinear Development of Acoustical Instabilities in Supersonic Jets (with M. Artola). Physica D, Vol. 31, 1988, pp. 285-317.

In addition, the following people have been partially or completely supported by this grant:

- R. Almgren - graduate student - Ph.D expected 8/89
- A. Bourlioux - graduate student - Ph. D. expected 7/90
- D. Chae - graduate student - Ph. D. expected 8/89
- Y.S. Choi - Post doc 1986-88
- M. Dillon - graduate student
- R. Dziurzynski - graduate student - received Ph. D. 6/87
- K. Lamb - graduate student - summer support
- D. Long - graduate student - received Ph. D. 11/86

Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

