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TIME-DEPENDENT MATHEMATICAL PROGRAMS.(U)
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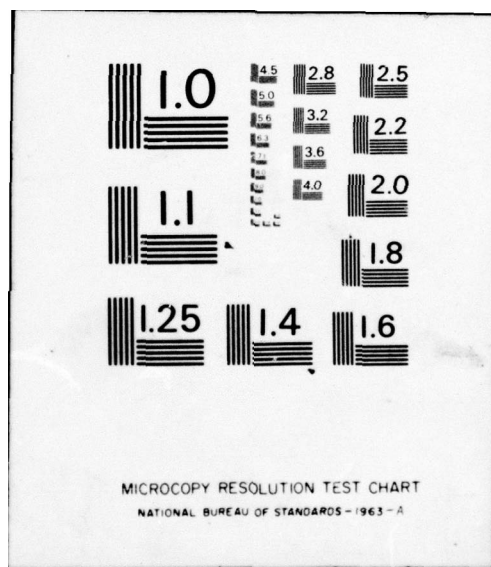
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FINAL REPORT

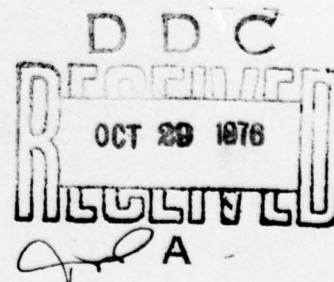
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September 13, 1974

U. S. ARMY RESEARCH OFFICE

CONTRACT: DAHC-04-71-C-0041

DEPARTMENT OF OPERATIONS RESEARCH ✓
STANFORD UNIVERSITY
STANFORD, CALIFORNIA



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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) STANFORD UNIVERSITY		2a. REPORT SECURITY CLASSIFICATION Unclassified	
		2b. GROUP NA	
3. REPORT TITLE ⑥ FINAL REPORT TIME-DEPENDENT MATHEMATICAL PROGRAMS. ✓ ⑨ Final rept. 25 Jun 71 - 24 Jun 74			
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Contract Period: 25 June 1971 - 24 June 1974			
5. AUTHOR(S) (First name, middle initial, last name) ⑩ B. Curtis Eaves Principal Investigator ⑫ 4p.			
6. REPORT DATE ⑪ 13 September 13, 1974		7a. TOTAL NO. OF PAGES	7b. NO. OF REFS 14
8a. CONTRACT OR GRANT NO. ⑮ DAHC-04-71-C-0041 ✓		8b. ORIGINATOR'S REPORT NUMBER(S) NONE	
9. PROJECT NO.		9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)	
10. DISTRIBUTION STATEMENT Approved for public release; distribution unlimited.			
11. SUPPLEMENTARY NOTES NONE		12. SPONSORING MILITARY ACTIVITY U. S. Army Research Office Box CM, Duke Station Durham, North Carolina 27706	
13. ABSTRACT The research supported under this contract has led, in conjunction with results of others, to a general new tool for solving systems of equations (e.g., differential equations). ↗			

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FINAL REPORT

The research conducted under ARO Contract DAHC-04-71-C-0041, which covered the period 25 June 1971 to 24 June 1974, is contained in the Reports [1] to [14].

The fundamental finding of this research is, in conjunction with that of others, a general new tool for solving systems of equations (hence differential equations, for example). This principle which was first described in [2] and [4] can be described as follows: To solve the given problem $f_1(x) = y$ one first deforms f_1 to f_0 where f_0 is of similar dimension and structure of f_1 and where $f_0(x) = y$ has a unique trivial solution x_0 . Then deforming f_0 back to f_1 , perhaps with regressions, one follows the solution x of $f_t(x) = y$ to obtain a solution to the given problem $f_1(x) = y$. This technique is distinct from classical methods of continuation in that the scheme can in a non cyclic, systematic way retrogress; as a consequence, a more difficult system of equations can be solved.

Given two to five more years of development this new technique will be a major force in solving large and difficult systems of equations. Already, more difficult problems are being modeled and solved (see the report [12], for example).

The reports [1, 3, 5, 6, 7, 8, 11, 13, 14] contributed to or extend the deformation principle described above.

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3. "Piecewise Linear Retractions by Reflexion," Linear Algebra and its Applications, 7, 1973, 93-98.
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14. "On the Need for a System Optimization Laboratory," with G. B. Dantzig, R. W. Cottle, F. S. Hillier, A. S. Mann, G. H. Golub, D. J. Wilde, R. B. Wilson, Math. Prog., Academic Press, 1973, 1-32.