MICROCOPY RESOLUTION TEST CHART
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TIME-DEPENDENT
MATHEMATICAL PROGRAMS

FINAL REPORT

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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).
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 $f_1(x) = y$ 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.


