IBM 7094 II digital computer. In all cases the step-size chosen with the Runge–Kutta method was taken to be as large as possible to just maintain stability. The equations were solved to at least 4 figure accuracy in all cases.

It is seen that the proposed method is significantly faster than the Runge–Kutta and faster than the standard Crank–Nicholson method in this example. It should be noted, however, that the storage space required in using the proposed method is greater than in using more conventional techniques. Approximately $5n^2$ words (where n is the order of the matrix A) are required for the case that n is large with the proposed method as compared to the n^2 words required in the case of the Runge–Kutta method.

Table 1

Time required to solve $\dot{x} = Ax + Bu(t)$

ORDER OF MATRIX A	SOLUTION BY RUNGE–KUTTA	SOLUTION BY STANDARD CRANK–NICHOLSON	SOLUTION BY PROPOSED METHOD
$n = 10$	40 minutes	3 seconds	0·2 seconds
$n = 30$	360 minutes*	33 seconds	2·2 seconds
$n = 50$	900 minutes*	90 seconds	10 seconds
$n = 70$	1800 minutes*	180 seconds	26 seconds

* These times are estimated.

Conclusion

It is believed that the method described in this paper represents an efficient technique for solving large sets of linear time-invariant differential equations. Equations of the type

$$\dot{x} = (A + \phi(x, t))x + Bu(t)$$

where $||\phi(x, t)|| \ll ||A||$, and this includes many physical processes, may be similarly considered by taking $\phi(x, t)x$ as part of the forcing function input.

References

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Book Review

Library Planning for Automation, edited by Allen Kent, 1966; 195 pages. (London: *Macmillan*, 52s.)

Dr Stafford L. Warren, special assistant to the President of the USA, proposed the setting up in America of a National Science Library System covering periodical literature in science, engineering, social science and law. This was to comprise a series of regional centres to store, in microform, perhaps 30,000 to 50,000 periodicals in the subject fields covered and make them available to academic and other libraries as required. It was envisaged that computer systems would be developed to provide access via a complete storehouse on tapes of summaries, abstracts and citations, and also to permit rapid and precise reaction to user requirements.

In order to scrutinize the Warren proposal the *Council of Library Resources* met the cost of bringing together a panel of experts, representing library planners and publishers of periodicals, to consider three papers. These were an outline of the Warren proposal itself, a paper on microforms which examined the state-of-the-art in relation to costs and equipment, and one on the influence of automation on the design of a university library.

The present book consists of the proceedings of the panel meetings, with full discussions, and an added paper on the question of copyright. The papers are good but the discussion, rendered verbatim, is of very variable quality. It is by no means always to the point and is sometimes trivial in content. On the whole the Warren project received a good deal of criticism, even from those librarians who had experimented with computer systems and mechanization and were partly committed in this direction. The value of the book, coming at the present time, is for the light it throws on changing attitudes in the American approach to library automation and retrieval. While most authorities accept that some degree of mechanization is inevitable and must be provided for in planning new libraries there is a growing tendency to look for simpler and less expensive solutions to problems, to delay the search for total systems, and to question the once firmly-held view that conventional libraries are heading towards a breakdown. Unavoidably the British reader will unfavourably compare the Warren concept with our own satisfactorily-operating *National Lending Library for Science and Technology*.

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