Table 1

r	$p_1^{(r)}$	$p_2^{(r)}$	$p_3^{(r)}$	$p_4^{(r)}$	$p_5^{(r)}$	$h^{(r)}$
0	0·00000000	0·00000000	0·00000000	0·00000000	0·00000000	206666·89
1	0·08268049	0·13503942	0·13597724	0·09493792	0·15998539	7502·8815
2	0·09923862	0·11076764	0·12183099	0·12872758	0·13931725	215·79632
3	0·09999730	0·11000218	0·12000549	0·12999819	0·13999653	0·66501625
4	0·10000008	0·10999995	0·11999990	0·13000032	0·13999975	0·02141011

Table 2

r	$\lambda_1^{(r)}$	$\lambda_2^{(r)}$	$\lambda_3^{(r)}$	$\lambda_4^{(r)}$	$\lambda_5^{(r)}$
0	2·4265380	0·50689792	0·21595877	−0·61679072	−0·91160397
1	4·0485474	0·61795635	0·40626636	−0·64914087	−1·0827891
2	4·0216960	0·61629394	0·42475279	−0·65958413	−1·0623187
3	4·0216093	0·61568511	0·42495200	−0·65946739	−1·0619393
4	4·0216090	0·61568327	0·42495310	−0·65946670	−1·0619385

7. Comments

We have had substantial numerical experience with this problem. In the majority of examples we have dealt with, the matrices were of orders up to 15, and with good initial approximations we have obtained results to 7 digit accuracy in about 6 iterations.

In some of the problems the number of parameters has been less than n. In such cases the least squares solution has been sought for; the behaviour of convergence has been much the same.

The number of possible solutions is theoretically $n!$ as the system is essentially an algebraic system of equations of orders $1, 2, \ldots, n$. None of the known methods for the solution of systems of non-linear equations provides us with all the solutions.

For the determination of other solutions we have had to rely on the rather *ad hoc* choice of different initial approximations.

It is possible to generalize the problem and the method in some ways. If the matrices (3) are non-symmetric the computation must be extended to the complex field, and in the calculation of derivatives one must employ the left-hand side eigenvectors too. If the matrix (1) is a non-linear function of parameters, the matrices A_k must be replaced by $\partial A/\partial p_k$ at a given point. We have had no numerical experience in such cases.

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Correspondence

To the Editor,
The Computer Journal.

Sir,

Orion FORTRAN compiler

Although one must support the praise for the Orion multi-programming supervisor given by E. C. Willey ("An established U.K. software development", this *Journal*, Nov. 1967), one regrets that he did not mention another development, the Orion FORTRAN compiler (this *Journal*, July 1964). This compiler, produced by a joint project of the Rutherford Laboratory and the Orion manufacturers, was written in its own source language (which is close to Atlas FORTRAN), met its target dates, and initially implemented all specified language features. It is still used by one organization for all commercial processing, as well as for technical and scientific calculations, in preference to the Nebula system. Two errors were corrected after release for general use. It took about 10 man-years; how many did Nebula need?

Yours faithfully,

R. TAYLOR

Rutherford High Energy Laboratory,
Chilton,
Didcot,
Berks.
23 November 1967.