

based on actual observed data. It could be used either for giving the individual user information concerning the waiting time for his job or for assessing the impact of changes on the system.

In Section 2, we graphically examined the conditional distribution of waiting time given queue length. From this, we suggested the model

$$t_p = a_p(b - b_0)_+ + c_p.$$

The parameters  $a_p$ ,  $b_0$  and  $c_p$  were estimated and found to be consistent across time.

In Section 4 an alternative model was developed based upon a 'standard' distribution subject to changes in location and/or

## References

- ANDERSON, H. A. and SARGENT, R. G. (1972). A Statistical Evaluation of the Scheduler of an Experimental Interactive Computing System, in *Statistical Computer Performance Evaluation*, Walter Freiberger (ed.) Academic Press: New York.
- BARD, Y. (1971). Performance criteria and measurements for a time-sharing system, *IBM Sys Journal*, Vol. 10 No. 3, pp. 193-216.
- LASSETTRE, E. R. and SCHERR, A. L. (1972). Modelling the Performance of the OS/360 Time-Sharing Option (TSO), in *Statistical Computer Performance Evaluation*, Walter Freiberger (ed.), Academic Press: New York.

## Book reviews

*MIS a Managerial Perspective*, by V. Thomas Dock, Vincent P. Luchsinger, William R. Cornette, 1978; 460 pages. (*Science Research Associates*, £6.25)

This is an anthology of 50 of the best papers on the subject of MIS published between 1965 and 1975. Its declared objective is 'to bring together articles that provide insight into the primary concepts of management information systems'.

The topics covered are a management perspective of systems, conceptual foundations of MIS, managing the MIS, MIS and people, MIS and society and the state of the art. Each chapter contains one paper and is followed by several discussion questions. Of particular merit is the inclusion of papers giving dissenting views as to the viability of MIS (chapters 12 to 16), which include the classic paper by R. L. Ackoff 'Management Misinformation Systems' (1967).

There are two further sections worthy of note, chapters 30 to 35 on 'Behavioral issues' and chapters 43 to 50 which comprise the 'State of the art' section. This latter section gives a number of case studies. For those wishing further reading, an overall bibliography is given at the front as well as a separate one for each chapter.

The editors have achieved their objectives and provided a well balanced, readable book.

D. D. BLACK (Crawley)

## Reference

Ackoff, R. L. (1967). Management Misinformation Systems, *Management Science*, December 1967.

*Management System Dynamics*, by R. G. Coyle, 1977; 463 pages. (*Wiley*, £16.95, £6.95 paper)

The introductory chapter states that 'System Dynamics is that branch of control theory which deals with socio-economic systems, and that branch of Management Science which deals with problems of controllability'. The objectives of a system dynamics study are to explain a system's behaviour over time in terms of its structure and policies, and to suggest alterations to the latter where the behaviour can be improved.

Chapters 2 to 8 provide a first course in the techniques of the subject and it is here that difficulties for the reader begin. I formed the conclusion that the techniques are complex but also that the chapters could have been written more clearly. New terminology and variable names appear at an incredible rate. At the same time, you are urged to think up examples, do some experiments and program runs, and reread previous chapters and sections at regular intervals.

Chapter 9 looks at dynamic processes in the firm and it is suggested that it can be read with the first and last chapters for a quick general view. However, the chapter is full of references back and

scale. This lead to the fit of a table of the form

$$z_{ij} + x_i + w_i y_j.$$

When the estimates were calculated, they again appeared consistent over time.

## Acknowledgements

The author would like to acknowledge the assistance of Peter Bloomfield in this work. Also, thanks are due to D. R. McNeil for the use of his computer program for fitting the tables in the second part of the paper. The referees are also acknowledged for their helpful comments.

uses a lot of previously defined terminology. Chapters 10 to 12 give examples of practical applications, although nowhere are examples of implementation given. The first case study develops a model whose results are not the same as real life. However, because the model was accepted by management the study was continued to find improved policies! At times one suspects that here is a technique being used on a modified problem. It is not apparent that other methods of analysis are not as good or better.

The last chapter on system dynamics in practice suggests that managers for whom you are going to use system dynamics should attend a short training session! The chapter ends with the statement 'The reader who has got this far deserves to be congratulated but can he now say, briefly, what he has learned?' Good question.

This book fails in its objective of demonstrating what system dynamics is about, and if and how to use it in practice. The fourth appendix suggests some training programs in the subject and provides a clue to my difficulties with the book. The two week practitioners' training course seems to rely almost entirely on the whole of this book, and it seems as if the book has in fact grown out of such a two week course. The preface does state that '... the reader who invests the necessary effort should be able to follow it all!' So, if you have two weeks to spare. . . .

R. J. PAUL (London)

*Microprogrammable Computer Architectures*, by Alan B. Salisbury, 1976; 161 pages. (*Elsevier North-Holland*, \$14.95 cloth, \$8.95 paper)

The author uses the term 'microprogrammable computer' to mean a computer which provides support for general purpose microprogramming by the user. The book provides an introduction to the microprogram-level architectures of such machines.

A slightly unusual format is followed in that the author first provides a succinct introduction to the major topics of the subject and then, devoting a chapter to each, describes in detail four examples of machines which are microprogrammable to a greater or lesser extent, the Microdata 3200, the Interdata 8/32, the Burroughs B1700, and the Nanodata QM-1. A final chapter briefly describes six other machines. A bibliography is provided with 83 entries of which the latest is August 1974.

In general, the book forms an effective introduction to this subject; however in some ways the presentation attempts to be too brief. This leads, in particular, to some of the machine descriptions being difficult to comprehend (for example the description of the QM-1 is extremely opaque in several areas which is a pity because it is the only example of a truly horizontally microprogrammed machine).

M. MCKAY (London)