increased by 50% (more uniform) or reduced by 50% (more modal). A small error caused by approximation is introduced by this method.

Taking the project of Figs. 5 and 6 by way of example, an appreciation of the sensitivity can be gained from the following experiments.

Experiment 1

Nine estimates (Fig. 6) gave outcome distributions as tabulated

	Approx. mode	*Mean*	*Standard Deviation*
Triangular inputs	14–16	17·9	7·7
All inputs more modal	16–18	17·9	6·3
All inputs more uniform	14–16	18·7	10·1

Experiment 2

18 estimates (being the nine estimates of Fig. 6, repeated)

Triangular inputs	14–16	16·5	2·8
All inputs more modal	16–18	16·7	2·6
All inputs more uniform	14–16	16·6	3·1

Fig. 7 shows the output of the model for experiment 1, triangular. Fig. 8 shows the output for the triangular model of experiment 2, but without any value of 'improved information'. The 'more uniform' version of this latter model produced a similar shape with a mean of 65 and standard deviation 31·1.

Appendix 2—Structure and testing of the program

The main program follows. The subroutine DHIST declares a histogram of the number of cells stated, first variate value and cell interval following. The subroutine TALLY accumulates a frequency count in the correct cell of a histogram while PRHIST draws out the results as in Figs. 7 and 8.

The function TRIANG follows. RANDOM returns a uniform sample in the range 0–1 and ISIGN returns the value of the second argument multiplied by the first.

Testing included the following procedures. RANDOM was tested for uniformity, with the seed employed in the model. Samples from TRIANG were collected for three different distributions and χ^2 tests performed to compare these samples with the theoretical distributions. The hypothesis that they came from the theoretical parent could not be rejected. A series of tests were made to ensure the model behaved in the expected way.

The alternative 10-cell histogram version had similar structure. This version was also tested with 'triangular' histograms prepared by hand from drawings following the same method used for more modal and uniform histograms. A two-sample χ^2 test of this result and that of the original version gave a good fit (1% level), the small difference being attributed to the approximation inherent in discrete histograms.

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Book reviews

Mathematical Systems Theory, edited by G. Marchesini and S. K. Mitter, 1976; 408 pages. (*Springer-Verlag Lecture Notes in Economics and Mathematical Systems*, Vol. 131, US$ 14.40)

This volume is a record of lectures delivered at the Conference on Mathematical Systems Theory at Udine, Italy in Summer 1975. The papers fall into six sections: Automata theory (1), Linear systems theory (6), Bilinear and non-linear systems (5), Infinite dimensional systems (6), Coding and filtering for sequential systems (4), General dynamical systems and categorical approach to systems (5). (Bracketed numbers indicate number of papers in each section).

A cursory examination of these papers reveals the opposition between the continuum and the discrete, which contributes to the difficulty of discerning a concept of any depth common to the designated areas. Indeed, the foreword truly admits that 'mathematical system theory is not a coherent discipline (as yet) . . .'. A curious omission is the flourishing subject of dynamical systems (the geometric theory and global analysis of differential equations) from this mixed bag of tricks.

In spite of the fragmentary coverage of material, the volume exhibits a diversity of new ideas which could provide considerable research stimulus.

J. P. Cleave (Bristol)

Analysis Instrumentation, Volume 14, edited by J. F. Combs, R. W. Sims and F. Martin, 1976; 125 pages. (*John Wiley for Instrument Society of America*, £9·75)

This is well laid out and well presented, much along the lines of the *Shock and Vibration Bulletin*.

The contents are obviously directed to the chemical engineer, detailing the practical aspects of instrumentation but lacking in the more theoretical approach to particular problems as may be required by research engineers. The papers on measuring techniques contain nothing new but shows only how different authors approach a problem using fairly well established electronic instrumentation. They could be of value to people approaching the area for the first time. The two papers on microprocessors are interesting in that they show that small computer systems are becoming more a part of laboratory equipment. However the first of these two papers puts the requirement of the engineer to learn the ways of small computers. It would be much better if the computer could learn the ways of the engineer. That is to say standardise control and analysis routines and provide many options to the user in a simple control program operated from a standard alphanumeric keyboard. The second of these two papers goes someway to show this.

R. E. Pacifico (Southampton)