

## SIMULATION OPTIMIZATION SYSTEMS

### Research Laboratory

Research, carried out in the Simulation Optimization Systems Research Laboratory, is in progress in five main areas.

The first involves the study of theoretical and computational aspects of design centering, optimal assignment of component tolerances, worst-case design, postproduction tuning and the determination and optimization of production yield. Applications are principally in electronic and microwave circuits.

The second area is the study of fault diagnosis and fault location of very large analog circuits subject to tolerances on all components and inaccurate measurements. Also under development are efficient approaches to postproduction tuning and alignment for optimally secure or reliable manufactured and operating systems.

The third major area involves computational techniques applied to power system simulation and design. Using exact a.c. power flow models, problems such as minimum loss, economic dispatch, centering w.r.t. security constraints as well as optimal security are being studied in cooperation with Dr. M.A. El-Kady of Ontario Hydro.

The fourth area concerns optimal tuning of microwave filters and multiplexing networks for satellite communication systems. The objective is to integrate the analysis, design, testing, experimental tuning and production alignment of the filters and multiplexers.

The fifth area deals with active and passive device modelling at microwave frequencies. In particular, CAD techniques suitable for GaAs MMICs are under development.

In all areas computer programs are being developed to reflect the data and specifications of industrial users.

General topics of interest include nonlinear programming, least pth and minimax approximation, worst-case design, yield estimation and optimization, sparse matrix techniques, hierarchical decomposition for very large systems, redundancy and reliability. Modelling and optimization are applied to complex systems as encountered in power networks, microwave filters and multiplexers, microwave integrated circuits and the solution of field problems.

Excellent computational tools are available, including user-oriented programs for analysis and optimization of large, sparse systems. Personal computers such as TI/PC and IBM AT are available and their use encouraged. Our software features high-level graphics, on-line editing, menu-driven presentation and file manipulators. Excellent interaction with industry is fostered and encouraged.

## J.W. BANDLER

John W. Bandler (S'66, M'66, SM'74, F'78) was born in Jerusalem, Palestine, on November 9, 1941. He studied at Imperial College of Science and Technology, London, England, from 1960-1966. He received the B.Sc. (Eng.), Ph.D. and D.Sc. (Eng.) degrees from the University of London, London, England, in 1963, 1967 and 1976, respectively.

He joined Mullard Research Laboratories, Redhill, Surrey, England in 1966. From 1967 to 1969 he was a Postdoctorate Fellow and Sessional Lecturer at the University of Manitoba, Winnipeg, Canada. He joined McMaster University, Hamilton, Canada, in 1969, where he is currently a Professor of Electrical and Computer Engineering. He has served as Chairman of the Department of Electrical Engineering and Dean of the Faculty of Engineering. He currently directs research, which has received substantial support by the Natural Sciences and Engineering Research Council of Canada under its Operating and Strategic Grants Awards, in the Simulation Optimization Systems Research Laboratory.

Dr. Bandler is also currently President of Optimization Systems Associates. Dr. Bandler has provided consulting services and software to numerous organizations in the electronic, microwave and electrical power industry, specializing in advanced applications of simulation, sensitivity analysis and mathematical optimization techniques.

He is a contributor to Modern Filter Theory and Design, Wiley-Interscience, 1973. He has more than 210 publications, four of which appear in Computer-Aided Filter Design, IEEE Press, 1973, one in Microwave Integrated Circuits, Artech House, 1975 and one in Low-Noise Microwave Transistors and Amplifiers, IEEE Press, 1981. Dr. Bandler was an Associate Editor of the IEEE Transactions on Microwave Theory and Techniques (1969-1974). He was Guest Editor of the Special

Issue of the IEEE Transactions on Microwave Theory and Techniques on Computer-Oriented Microwave Practices (March 1974).

Dr. Bandler is a Fellow of the Royal Society of Canada and of the Institution of Electrical Engineers (Great Britain). He is a member of the Association of Professional Engineers of the Province of Ontario (Canada).