

# Authors

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B.S. in Mathematics and Physics (first rank in the University), 1950, Bombay University; M.S. in Mathematics (first rank in the University), 1952, Karnatak University, India; Ph. D. program in Mathematics, 1956-60, Boston University; graduate studies in Mathematical Statistics, 1958-61, Columbia University; graduate studies in Electrical Engineering, 1962, Massachusetts Institute of Technology; graduate studies in Operations Research, 1965-present, New York University. Has been an Assistant Professor of Mathematics at Wilson College, Bombay University, and an instructor at the Boston University Graduate School. Joined IBM in 1958 at the Thomas J. Watson Research Center, where his most recent work was in physical information theory, statistics and operations research, and information retrieval. Joined CHQ staff in 1967 as manager of analytical studies in the Management Science Services Department. Member, Institute of Mathematical Statistics and Sigma Xi.

## Jean-Claude Arinal

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Degree of Ingénieur IDN and Lic. es Science, 1961, University of Lille; Ph.D. in Applied Mathematics, 1963, Faculté des Sciences, Caen. Was a member of an operations research group at Direction des Etudes et Recherches, Electricité de France, 1963-1968. In 1968 he joined the Scientific Development Department, IBM France, to work on a variety of combinatorial problems. He currently holds the position of Scientific Advisor to this Department. Member, AFCET.

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Electrical Engineering, 1957; Lic. es Science in Applied Mathematics, 1958, University of Grenoble. Joined IBM in 1961 at the French Laboratory and worked on GPSS simulations and statistical analysis of experimental results. He was responsible for the development of an early version of the IBM 2750 Operational Program from 1964 to 1966, and was a programming assistant to the Development Manager of the Special Communication Program from 1966 to 1968. Currently, he is manager of a programming group in the Special Communications Program.

## Bernard Corby

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Ingénieur diplômé, 1951, Ecole Supérieure d'Electricité. Joined the IBM France Laboratory in 1952. He participated in the design of electronic unit record equipment until 1959, and from 1960 to 1964 was assistant to the product development manager for data collection and data transmission development activities; from 1964 to 1968, he worked on the architecture of line switching equipment. He is currently Manager of the Reliability and Serviceability group at La Gaude.

## Wilm E. Donath

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B.S. in Chemical Engineering, 1954, Carnegie Institute of Technology; Ph.D. in Physical Chemistry, 1958, University of California, Berkeley; one year postdoctoral study at the Polytechnic Institute of Brooklyn, 1958-1959. Joined IBM at the Watson Laboratory in New York City, 1959, and worked on atomic and molecular properties there and at the Research Center until 1963, when he joined the design automation group and worked on automated packaging design methods for electronic circuitry. For the past year he has been working on the mathematical aspects of design automation. Received Outstanding Contribution Award for work on Light Table Artwork Generation System in 1968. Member IEEE, SIAM, AMS, and Fellow of the American Institute of Chemists.

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B.Sc. in Mechanical Engineering, 1949, Cairo University; M.S. in Industrial Relations, 1958, Cornell University; and Ph. D. in Operations Research, 1965, University of California, Berkeley. He was a Research Assistant in the Operations Research Center at the University of California, Berkeley from 1962 to 1965; a Senior Research Associate in the Operations Research Department of the Mobil Oil Corporation, New York, from 1966 to 1968. Joined IBM in 1968 as a Business Scientist in the Management Science Services Department at Armonk. Member, Operations Research Society, the Institute of Management Science, and the Association for Computing Machinery.

## William H. Evers

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B.E.E., 1951, Cooper Union; M.I.E., 1953; M.S. in Applied Mathematics, 1958, both from New York University; Ph.D. in Operations Research, 1965, University of Michigan. Was a digital electronics development engineer at the Ford Instrument Co., New York, 1951-1953; Lt. jg. U. S. Navy Communications Electronics Division at the Pentagon, 1953-1957; Advisory Engineer in logic design and computer programming at the Sperry-Rand Corporation, 1957-1959. Joined IBM Data Processing Division in 1959 as an Applied Science Representative in New York. Appointed Manager of Gaming and Simulation, Federal Systems Division, 1962-1963. Awarded IBM Resident Graduate Fellowship and attended University of Michigan 1963-1967. In 1968, he joined Management Science Services at CHQ in Armonk, where he is now Manager of Operations Research. Member, Sigma Xi, Operations Research Society, Society for Industrial and Applied Mathematics, The Institute of Management Science, American Association for the Advancement of Science.

## Robert L. Griffith

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B.S.E.E., 1960, University of Arizona; M.S.E.E., 1967, University of Santa Clara. Joined IBM at San Jose in 1960 to work as a logic designer. His primary activity since then has been digital systems design for special systems, control systems, and photo-digital mass storage systems. His current assignment is in advanced storage architecture. Member, IEEE.

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B.S. in Engineering, 1953, National Taiwan University; M.S. in Engineering, 1956, University of Illinois; Ph.D. in Applied Mathematics, 1960, Brown University. He was a research staff member at the Thomas J. Watson Research Center, 1960 to 1966. During this time he was also a Visiting Associate Professor at the University of California, 1964-1965, and an Adjunct Associate Professor at Columbia University, 1965-1966. He became an Associate Professor at the University of Wisconsin, 1966-1968, and in 1968 he assumed his current position as a Professor of Mathematics in the Research Center and Computer Sciences Department of the University of Wisconsin. Associate Editor, *J. ORSA* and a member of Operations Research Society of America and SIAM. Author of the book *Integer Programming and Network Flows*, Addison-Wesley, 1969.

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B.A. in Physics, 1960, Princeton University; M.S. and Ph.D. in Physics, 1963 and 1966, respectively, University of Alabama. Was Research Associate 1965-66 at the University of Alabama; Assistant Professor of Physics 1966-69 and Head of Physics Department 1968-69 at Christian Brothers College, Memphis, Tennessee. Joined IBM Federal Systems Division in Huntsville during summers of 1968 and 1969 as a visiting Faculty Member to study problems in plasma physics and statistical kinematics as member of an Applied Research Group. Member, Sigma Xi and American Physical Society.

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Ph.D. of Engineering in Physical Metallurgy, 1958, Technical University of Berlin. Was Research Associate in the Metallurgy Department of the University of Pennsylvania, 1958-1960. He became a member of the professional staff of the RCA David Sarnoff Research Center, Princeton, N. J., where he worked on component semiconductors, 1960-1963. Joined IBM at the Boeblingen Laboratory, Germany in 1963. He was the Manager of Semiconductor Technology Development. Currently, he is Manager of Technology and Reliability Development at the laboratory in Burlington. Received invention awards in 1969 for work on semiconductor devices. Member, ASM and AIME.

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B.S. in Physics, 1964, and candidate for Ph.D. in Physics, 1969, University of Alabama. Was Senior Mathematician, 1959-63, for Thiokol Chemical Corporation; was Research Assistant, 1964-67, and Instructor of Physics, 1967-68, at the University of Alabama. Joined IBM Federal Systems Division in Huntsville in 1968 as member of an Applied Research Group to study missile discrimination techniques. Is currently performing nuclear radiation environment and reentry physics studies. Member, Sigma XI and American Physical Society.

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B.S. in Physics, 1959, University of Florida; M.S. in Applied Physics, 1962, University of California at Los Angeles; Ph.D. in Physics, 1965, University of Alabama. Was Assistant Research Professor of Physics 1964-65 at the University of Alabama and Assistant Professor of Engineering Science 1965-66 at Florida State University. Joined IBM Federal Systems Division in Huntsville in 1966 to study technical approaches to a variety of proposed space and defense systems. Is currently Manager of an Applied Research Group performing design and effectiveness evaluation for several missile systems, and part-time faculty member at the University of Alabama in Huntsville. Member, Sigma Xi, Society for Engineering Science, and Senior Member, IEEE.

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B. Tech. (with honors) in Mechanical Engineering, 1965, Indian Institute of Technology, Kharagpur; M.S. in Operations Research, 1966, University of Minnesota; and working towards Ph.D. in Operations Research, New York University. He was a lecturer in thermodynamics at Indian Institute of Technology, 1965. He joined the American Oil Company in 1966 and worked on the large-scale-investment allocation problem. Came to IBM Corporate Headquarters in 1967 to work on a variety of problems in management decision making. In particular, he developed and implemented a purchase prediction model for data processing equipment and is currently working on probability distribution of functions of random variables with application to statistics, business and engineering analysis. Member, Society of Industrial and Applied Mathematics.

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Degree of Ingenieur Civil des Mines 1965, Ecole Nationale Supérieure des Mines de Paris; M.S. in Electrical Engineering, 1966, Stanford University. Joined the Scientific Development Department of IBM France in 1966 to work on sequencing and scheduling in industry, combinatorial problems and implicit enumerative techniques. His current position is Scientific Advisor to this Department. Member, AFCET.

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B.S. in Electrical Engineering, 1960, Princeton University; M.S. in Industrial Engineering, 1969, Syracuse University. He joined IBM in 1960 to work on the SMS design automation system and has been involved with the development of design automation systems for several later technologies. His primary work has been in the automatic packaging and wiring area. Currently, he is the manager of a design programs group for the Engineering Information System.

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Ingénieur in Electrical Engineering, 1959, and in Radio Engineering, 1960, École Nationale Supérieure d'Electricité, d'Hydraulique, et de Radio de Grenoble; Lic. es Sci., 1960, Grenoble University. Joined IBM France in 1962 at La Gaude to work on the development of thin-film magnetic devices. Since 1964 has taken part in the development of the switching network of the IBM 2750.

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Ecole Centrale des Arts et Manufactures, Paris, 1956; Dr-Ing., 1963, (semiconductor) Technische Hochschule Darmstadt (Germany). Joined IBM in 1961 at the laboratory in La Gaude, France, to work on electrodeposition of magnetic films; he received an IBM invention award in 1965 for work on electrodeposition. In 1964, he was assigned to the telephone switching system project to work on the specifications for the electronic crosspoint switches. In 1968 he transferred to the Research Center where he joined a group working on circuits for a large-scale integration project. He is currently involved in problems related to data transmission. Member, IEEE.

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B.S., 1959, and M.S., 1961, both in Electrical Engineering from the University of New Mexico. Upon completion of the B.S. degree, he worked as a Research Assistant in the Solid State Physics Research Laboratory of the University of New Mexico. He joined IBM in 1961, where he has been working in the design and development of semiconductor devices. In 1966 he received an IBM fellowship for graduate study at the University of Illinois where he is now completing the requirements for the Ph.D. degree. Member, Sigma Tau and Sigma Xi.

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Bachelor of Civil Engineering, 1964, City College, New York; M.S. in Operations Research, 1965, University of California, Berkeley; currently a Doctoral Candidate in Operations Research at the University of California. Was

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