Abstracts

Listed are abstracts from recent papers by IBM authors. Inquiries should be directed to the publications cited.

Evolution of design automation, P. W. Case, *Computer* **5,** No. 3, 21–22 (May/June, 1972). What conclusions can be drawn after the first fifteen years of design automation? One is the increasing dependence of the designer on design automation aids. Engineers involved in computer design today would sooner part with their slide rule than they would with the computer they use as a design tool. This trend is, if anything, accelerating. The most successful systems will be those which can be designed such that the man and the machine most effectively complement each other.

Optimization and computation applied to power system scheduling and control, A. Chang and P. E. Mantey, *Automatica* **7,** 417–430 (July, 1971). Algorithms have been developed for dynamic rescheduling and control of generation to modify the state of an interconnected power system. The algorithms can be used to achieve control of m-1 scalar quantities in a power system by individually adjusting the generation at m power plants. Specifically, the algorithms can be used to schedule the power flow on individual lines or tie-lines to other systems, or the voltage phase-angle differences between arbitrary nodes in a power system. The algorithms developed are for use in a preventive mode, and would be used to improve power system security. The rescheduling problems are solved by linearization and utilize techniques of optimal control theory. The algorithms developed have computational requirements, when advantage is taken of the sparsity of the matrices involved, which make possible their utilization as on-line tools. The control, used to move the generation to the newly rescheduled state, is also quite easy to implement and can be carried out by a central computer facility. The control approach described yields very smooth transitions in power output between the existing and rescheduled levels. Simulation results demonstrate that control of the system to the newly scheduled state can be accomplished in about two minutes.

Review of current proposed technologies for mass storage systems, R. E. Matick, *Proceedings of the IEEE* **60,** No. 3, 266–289 (March 1972). Several years ago, let us say 1965, there were few serious technological challengers for large main memories and file storage systems for computers. Magnetic cores and rotating magnetic disks were the undisputed champions. While there was no lack of alternatives in the mid 1960's, cores and disks still offered potential improvements which could not easily be challenged by other technologies. The status of computing systems has advanced to a point where currently, as in the past, larger and faster access storage is needed. While there still exists room for improvement in cores and disk technology, the tradeoffs between size, speed, and cost suggest that other technologies may now offer certain advantages. As a result, numerous technologies have appeared recently to offer alternatives for large storage systems. Some of the more notable proposed technologies currently receiving considerable attention in the published literature will be reviewed. After a discussion of the limitations and technical aspects of magnetic recording and a systems analysis of direct access storage, a review of the more advanced technologies of surface wave acoustics, magneto-optic beam-addressed memories, magnetic bubbles, switchable resistances, and integrated circuit memories of various types is undertaken. A discussion of the device concept with a possible system implementation for mass storage is presented along with conceivable densities, speed, advantages and disadvantages, and inherent limitations.

The distribution system simulator, M. M. Connors, C. Coray, C. J. Cuccaro, W. K. Green, D. W. Low, and H. M. Markowitz (Arbitrage Management Co., Inc., Los Angeles, Cal.), *Management Science* **18,** No. 8, B425–B453 (April 1972). The Distribution System Simulator (DSS) is a software system designed to overcome the difficulties inherent in the construction and use of simulation models for large-scale, physical distribution systems. The central difficulties associated with the simulation of a distribution system are: (1) defining a suitable model, (2) programming the model for a computer, (3) obtaining appropriately indicative output reports from the distribution simulation, (4) ordering the model repetitively to respond to the implications of the output reports so that the practical consequences of theoretical changes can be determined. The Distribution System Simulator provides a means for accomplishing these ends without programming effort on the part of the user.