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DIGITALE SIMULATION

(Numerical Simulation)

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Specialists in the analysis and designig of systems are ever more in need of a practical guide of the simulation method. In this connection, the work is making a deserving contribution, succeding in synthetizing the most representative simulation techniques.

The method of simulation has become an instrument which is ever more frequently used in the designing of systems. The systems having random sizes of feed in-feed back have been studied with priority within numerical simulation. Two different methods: the Monte-Carlo method and the indirect method can be used for the study of random phenomena.

The Monte-Carlo method can be easily applied in practice, having however the disadvantage that the repetition several times (hundreds and even thousands of times) of the simulation cycles is necessary for eliminating the random character of results. In opposition to the Monte-Carlo method, the indirect method has appeared in the last few years, which however has not so much developed, but, the applicability of which was evident especially in the traffic systems. The advantage of the indirect method lies in the obtaining, only from a single cycle of calculus, of the function for the distribution of the feedback size which is of interest. The necessity of repeating the calculs is thus eliminated.

The BERSIM simulation method is recommended for solving trafic questions. It operates with a number of component parts (junction, station, the confluence of streets, parking, points, delay, etc.), especially conceived for a simulation of traffic questions, component parts which may, however, be valid also for other systems. Their list is open and other component parts may be introduced, if necessary.

The universal programming languages (ALGOL, FORTRAN, COBOL, PL 1, etc.) may be used for the application of simulation methods. By studying the simulation methods, they note that certain characteristic modules are practically the same for nearly all problems. For example, the necessity is constantly appearing of generating random numbers, of ordering in time two pre-established rules and of attributing certain special quantities to the active and passive elements comprised in the model, etc. The choice of the simulation language is often dictated by the computer at the analyst's disposal. The SIM simulation language is eliminating this inconvenience. Through SIM, every analyst of systems has at his disposal a concept of language independent from the computer used. In addition, the SIM language

is simple, it can be easily assimilated and has adaptation possibilities. It can be achieved on any computer provided with a FORTRAN, ALGOL or PL 1 compiler.

The study has the merit to complete the approached theoretical aspects with concrete examples of simulation, a fact which enables the reader to become more rapidly familiar with the simulation techniques.

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