R. E. MACHOL: System Engineering Handbook

Published by McGrow Hill, 1965, New York, San Francisco, Toronto, London, Disney, 1036 pp.

Besides science analytical development — a process by which new knowledge in a particular field is constantly stored up, while new properties of a certain phenomenon or system are being discovered — some new synthesis sciences are also developing nowadays. Cybernetics, for instance, or electromagnetic field theory. In the literature referring to this category of sciences, the discipline generally known as „system engineering" has come out recently.

It consists of considering some of the most varied concerns of contemporary science from an altogether new angle.

The notion of system is, in the main, familiar; still, in our opinion, an attempt to make it clearer would be worthwhile. The best way to do it is to examine the different types of systems studied in this paper.

The present work is composed of several parts, the first being an introduction showing the system engineering methodology.

The second section is dedicated to surrounding systems: oceans, land masses, urban areas, lower athmosphere, upper athmosphere, space and astronomy.

The third one deals with the systems components, analyzed from up-to-date standpoint. The reader is able to acquire a series of fundamental notions, expounded with utmost conciseness, about: digital computers, logical circuits, analogue elements, hybrid computers, communications equipment, radar, infrared, optical sensors, satellite systems, aerodynamic systems, guidance, propulsion, energy conversion systems.

The fourth section is concerned with systems theory. Information theory, game theory, decision theory, simplex method, making-models and linear dynamic programming, queues and Markov processes, feed-back systems, adaptive and learning control systems are displayed therein.

The fifth part deals with systems technique. It includes human information processing concepts, simulation, reliability, system testing, economy, management, radio-telemetry systems.

In the last chapter some mathematical notions are provided in connection to system engineering: probabilities, Laplace and related transforms proprieties, numerical analysis elements, propositional calculus elements.

This work constitutes an excellent handbook in which various problems are tersely expounded, by person being authorities on the matter, resorting to the latest up-to-date methods of contemporary science: flow graphs, integral transforms etc.

Owing to its abundent and ample information, this handbook is particularly useful to those interested in cybernetics, automatics, as well as engineering new ways towards progress and multifarious achievements.

It is, as well, of great utility to those concerned with economic cybernetics; for it is imperative they had a knowledge of the systems cybernetics, both from the systems general standpoint (economic systems included) and from the point of view of the means and methods used in order to achieve the optimizations aimed at, mathematical methods, computers and electronic equipment.

The book is written with full competency. Although a handbook usually is but an introduction, this particular one, by its ample reference material, offers to all concerned valuable indications as to fundamental works elaborated in the different scopes tackled therein.

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