

BOOK REVIEW – BUCHBESPRECHUNG

T. J. WILLIAMS:

Systems Engineering for the Process Industries

McGraw-Hill Book Company Inc. 1961. (92 large-sized pages, 14 chapters, 96 illustrations, 7 photos).

Process control is a comparatively young branch of engineering sciences. The work under review is one of the first to offer a comprehensive survey of the principles and the present state of system engineering in respect of the chemical industry; it presents, moreover, a synopsis of results achieved and trends of future developments to be realized.

For the sake of simplicity, author starts from a fictitious but realistic example and shows how the different departments of a chemical works have to co-operate, how the chemical engineer and the control engineer have to work in full harmony so as to obtain the best results in manufacturing and marketing new products. The book discusses the widespread utilization of different kinds of analogue and digital computers for the purposes of planning and manufacturing alike.

Each of the chapters has already been published: they appeared in a serial form in the review *Chemical Engineering* in the course of the last two years. Their sequence has been left unchanged in the book. The titles of the individual chapters will give a general idea about the scope of the work:

1. Systems Engineering; 2. Process Research; 3. Process Development; 4. Prelimi-

nary Design; 5. Process Plant Design; 6. Plant Studies; 7. Process Control; 8. Control Theory; 9. Mathematics of Control; 10. Control Design; 11. Systems Literature; 12. Computer Control; 13. Plant Unit Design; 14. About the Future.

The mathematical apparatus employed by the author is not too complicated: readers conversant with the differential and the integral calculus, and having a certain knowledge of the use of operational calculus will have no difficulty in following the authors arguments. Nearly a hundred clear diagrams, illustrations and, especially, tabular summaries in the text permit a better understanding of the work. Errors occur comparatively rare: Figs. 4 and 8 of Chapter 8 are, for instance, wrong.

The book under review may be regarded as a good introduction into the intricacies of systems engineering: it presents its fundamental principles in respect of process industries. Bibliographical references attached to each chapter facilitate the further studies. The list of books and periodicals concerning process control, contained in Chapter 11, comprises not less than 244 items and is particularly valuable in this respect.

F. CSÁKI

MARTIN R. REDWOOD:

Mechanical Waveguides

Pergamon Press 1960

This book is appropriate as a comprehensive survey of the theoretical treatment of guided mechanical waves. Throughout the work the emphasis is on the theoretical analysis of wave propagation but there are no details of the experimental techniques to

support these theories, apart from a list of references. The problems of transducers (generator, detector), internal friction, materials and practical applications are beyond the scope of discussions. The subject of the work is better expressed in the sub-title:

“The propagation of acoustic and ultrasonic waves in fluids and solids with boundaries.” Most of the book concerns itself with the examination of boundary conditions, choosing solutions to the wave equation, what fits these conditions, and interpreting the physical significance of the results.

The first chapter deals with stress-strain relations and with deriving relations for anisotropic solids and with the wave equation for an unbounded medium the plane waves are investigated in fluids and in solids, and the same is done with cylindrical and spherical waves in fluids.

Reflections and refractions of waves at a fluid-vacuum and solid-vacuum interface are examined in the second chapter, and a brief survey is given of the reflections at solid-solid, solid-fluid and fluid-fluid interfaces, and as a special case the surface waves (Rayleigh-waves) are dealt with.

In the third chapter continuous waves are discussed in the fluid plate and cylinder resp. with free and rigid boundaries.

In the following chapter after some general remarks concerning pulse propagation the Laplace transformation is applied to a fluid cylinder.

The 5—10. chapters are devoted to solid waveguides. Solutions of the wave equation

for solid plates and for solid cylinders are given. Accounts of some approximate theories are found in Chap. 7. An analysis of the rectangular rod and cylindrical shell are tackled, using approximate theories in Chap. 8.

In the practical applications of mechanical waveguides, the propagating signal is more often a pulse than a continuous wave. Therefore, Chap. 8 and Chap. 9 are of great importance. Several of the most successful analyses are described here, which are suitable for the mathematical treatments of pulse propagation in a solid waveguide.

In the last three chapters the author has given analytical methods applied to multi-layered waveguides, a survey of solid resonators, and some references to anisotropic waveguides.

Throughout the book the vector notation is only occasionally used. References mentioned in the text are given with titles, at the end of the appropriate chapter. Moreover, a great many other titles and locations help the reader.

The precise references in the text make this valuable book even more useful not only for the expert reader, but also for those who are just becoming acquainted with this subject.

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