BOOKS

Chemical Process Dynamics, Rezso Mohilla and Bela Ferencz, Vol. 4 of Fundamental Studies in Engineering, Elsevier/North Holland, 1982, 299 pages, $63.75.

This book is an enlarged English version of the Hungarian book Vegyipari folyamatok dinamikaja, published by Muszaki Konyvkiado, Budapest. It is intended to develop a connection between classical chemical engineering analysis and industrial process control.

Subject matter is divided into four sections—a brief section that presents chemical process dynamic modeling fundamentals and process control fundamentals, two large sections that develop dynamic models for several common chemical processes, and a small section that includes examples of "multi-loop" control applications in the chemical industry. The two modeling sections occupy about two thirds of the books volume, and it is these sections that make it worthwhile.

The authors develop from first principles dynamic models for a wide variety of chemical processes. Their methodology is general and encourages other models to be derived by analogy. Results are given in continuous transfer function (and/or frequency function) form. The first modeling section discusses processes that can be described by ordinary differential equations, including: fluid (liquid, gas) flow in lines with valves, storage in tanks, tanks in series, blending, heating by steam injection, absorption in plate columns, extraction, heat transfer in shell-type heat exchangers, drying, condensation and evaporation, rectification in plate columns, rectification in an isothermal tank reactor, isothermal tank reactors in series, and chemical reaction in polytropic tank reactors. The second modeling section discusses processes that can be described by partial differential equations, and includes: non-steady-state heat flow, flow of multicomponent media in tubes, absorption (or extraction) in packed columns, heat exchangers, reaction in an isothermal tube reactor, flow of gases and vapors in tubes, and reaction in a non-isothermal tube reactor.

Educators and practictioners alike can benefit from this book. It could be used as a reference or source for a graduate course dealing with chemical engineering modeling for process control purposes. An engineer working in the area of industrial process control who sometimes develops dynamic process models would find it helpful. Some knowledge of partial differential equations, complex variables, and vector and tensor analysis is required.

G. D. Martin
Setpoint, Inc.
950 Threadneedle, Suite 200
Houston, TX 77079

Foundations of Computer-Aided Chemical Process Design, Volumes 1 and 2, edited by Richard S. H. Mah and Warren D. Seider, Engineering Foundation, New York, 1981, $40.00 per set ($24.00 per volume) for AIChE members, $50.00 per set ($30.00 per volume) for nonmembers.

These volumes represent the proceedings of an international conference on computer-aided design held in July, 1980. This meeting brought together roughly 150 researchers and practitioners from both university and industrial settings for a week-long discussion of the state-of-the-art in several subfields of importance in computer-aided process design. The two volumes are organized into eight sections covering nonlinear algebraic equations, nonlinear programming, ordinary and partial differential equations, flowsheeting programs, thermophysical and transport properties, modeling and analysis of multistaged towers, modeling and analysis of chemical reactors, and process synthesis. Each section is highlighted by a state-of-the-art review of the subfield, followed by one to three more specific reviews or papers, concluded by a short summary that also looks toward future needs in the field. The reader who may be interested in obtaining only one of the two volumes should be forewarned that, at least in some copies, the title page of Volume 1 indicates that it contains the sections covering covering the last four subfields listed above, while it in fact contains the other four sections, and vice versa for Volume 2.

The most valuable feature of these volumes is the collection of state-of-the-art reviews. In addition to summarizing recent work in a subfield, these reviews are also generally useful as tutorials. This is in keeping with the intent that the conference provide an opportunity for participants to be brought up-to-date on subfields not in their own specific area of expertise. Readers, both researchers and practitioners in computer-aided process design, will be able to avail themselves of the same opportunity through these review articles, several of which would also be excellent additions to the reading list for a graduate-level course in computer-aided process design.

Though the scope of these two volumes is wide it is still insufficient to cover the broad and rapidly growing field of computer-aided process design. Some important subfields not considered in any detail include batch processes, nonsequential-modular flowsheeting, graphics, and data base management. It is interesting to note that a second conference on the Foundations of Computer-Aided Process Design, covering some of these areas and others, is planned for June 1983.

Mark A. Stadtherr
Chemical Engineering Department
University of Illinois
Urbana, IL 61801