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ChE (book review)

PROCESS SYSTEMS ANALYSIS AND CONTROL, 2nd edition

by D. Coughanowr
McGraw-Hill, 1221 Avenue of the Americas, New York, NY 10020; $52.95 (1991)

Reviewed by
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I learned process concepts from the first edition of this book when I was a student at the University of Arkansas. The clarity of its presentation and the effectiveness of the instructor (Carl Griffis) have been the main reasons for my sustained interest in process control for the last twenty years.

Much of the material from the first edition has been retained in the second edition, but there are additional new chapters on advanced control strategies, process identification, sampled-data control, state-space representation, multivariable control, and computers in process control applications.

In advanced control, Professor Coughanowr covers cascade and feedforward control, ratio control, dead-time compensation, and internal model control. In the chapters on sampled-data systems the author discusses sampling operations, Z-transforms, design of sampled data controllers, and stability. The chapter on state space method is a good introduction to the subject, as is the chapter on multivariable control.

In the chapter on computer simulation, the author discusses the use of TUTSIM and its potential applications to process control problems. TUTSIM uses an analog computing type of logic and is easy to learn and use. In the last chapter the student is introduced to distributed control concepts. The new material is well written and clear. However, in many instances the level of detail is so small that it is not of much practical use. (But, in a first course in process control, how many topics can be covered?) Also, there does not appear to be enough examples and problems in some of the chapters.

Having made a phenomenal impact on improving quality (and therefore competitiveness) in discrete manufacturing industries, Statistical Quality Control (SQC) concepts have arrived on the scene in continuous industries as well. Statisticians are routinely consulted on issues of quality, but the control engineer is on the sidelines, often unable to make an impact on process operations. Control technologies which can be shown to have a direct impact on quality are needed. This text, as well as others on the market (including ours), does not appear to provide these perspectives to the student.

In closing, the second edition is a good addition to the collection of textbooks on undergraduate process control, subject to the comments in this review. Students and instructors alike will enjoy learning and teaching from this book. ❐

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how it might have been avoided, and how it can be prevented in the future.

There are sample problems throughout the text, and each chapter has problems and questions at the end. Most of the sample problems are clear and easily followed. A manual containing solutions for most of the problems is available. A few of the solutions are incorrect, but the errors are mostly minor and easily found. There are some errors in printing, again mostly minor, and mostly identified in an errata list available from the authors. The errors distract little from the presentation of the material.

I find the text to be a welcome addition; it presents more than enough material for an undergraduate course in chemical process safety. It contains sufficient references that considerable additional material can be found, either for incorporation by the instructor or for additional study by the student. The book can also serve the practicing engineer by providing a basic background for understanding other information that is available. The most important accomplishment of the text may be that it provides the basis for including the study of chemical process safety in the curriculum for chemical engineers. That is something we need to have emphasized more strongly if we are to be professionally competent. ❐