

Statistics for Chemical and Process Engineers: A Modern Approach

By Yuri A.W. Shardt

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A coherent, concise and comprehensive course in the statistics needed for a modern career in chemical engineering; covers all of the concepts required for the American Fundamentals of Engineering examination.

This book shows the reader how to develop and test models, design experiments and analyse data in ways easily applicable through readily available software tools like MS Excel® and MATLAB®. Generalized methods that can be applied irrespective of the tool at hand are a key feature of the text.

The reader is given a detailed framework for statistical procedures covering:


- data visualization;
- probability;
- linear and nonlinear regression;
- experimental design (including factorial and fractional factorial designs); and
- dynamic process identification.

Main concepts are illustrated with chemical- and process-engineering-relevant examples that can also serve as the bases for checking any subsequent real implementations. Questions are provided (with solutions available for instructors) to confirm the correct use of numerical techniques, and templates for use in MS Excel and MATLAB can also be downloaded from extras.springer.com.

With its integrative approach to system identification, regression and statistical theory, *Statistics for Chemical and Process Engineers* provides an excellent means of revision and self-study for chemical and process engineers working in experimental analysis and design in petrochemicals, ceramics, oil and gas, automotive and similar industries and invaluable instruction to advanced

undergraduate and graduate students looking to begin a career in the process industries.

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About the Author

Prof. Dr. Yuri A. W. Shardt is currently an assistant professor at the University of Waterloo in the Department of Chemical Engineering, working in the field of process identification and monitoring with an emphasis on the development and industrial implementation of soft sensors. Previously, he worked at the University of Duisburg-Essen in the Institute of Control and Complex Systems (Fachgebiet Automatisierungstechnik und komplexe Systeme, AKS) as an Alexander von Humboldt Fellow. He has written 14 papers appearing in such journals as *Automatica*, *Journal of Process Control*, *IEEE Transactions on Industrial Electronics*, and *Industrial and Engineering Chemistry Research* on topics ranging from system identification, soft sensor development, to process control. He has presented his research at numerous conferences and taught various courses in the intersection between statistics, chemical engineering, process control, EXCEL®, and MATLAB®. Prof. Dr. Shardt completed his doctoral degree under the supervision of Prof. Dr. Biao Huang at the University of Alberta. His thesis examined the methods for extracting valuable data for system identification from data historians for application to soft sensor design. In addition to his

academic work, he has spent considerable time in industry working on implementing various process control solutions. He also has interests in linguistics, as well as software internationalisation and localisation.

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