

Electrical Power System Essentials

By Pieter Schavemaker, Lou van der Sluis

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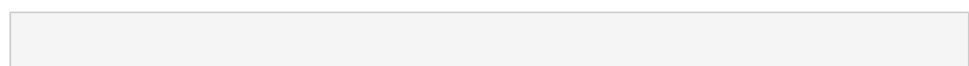
Much of the basic hardware that generates, transmits and distributes electricity has changed little over the past century. However, the techniques applied in the power system have advanced, leading to greater transformer efficiency and more economic transmission and distribution. As the demand for electricity in both the developed and developing world increases, governments and electricity providers continue to look for alternative means of creating energy through renewable sources. Today's needs also include well-designed systems that are capable of producing large quantities of electricity in the safest, most cost-effective way for the benefit of both individuals and industry.

This book provides an accessible introduction to the interesting world of alternating current (AC) power systems, focusing on the system as a whole. After laying out the basics for a steady-state analysis of three-phase power systems, the book examines:

- the generation, transmission, distribution, and utilization of electric energy;
- the principles of thermal, nuclear and renewable energy plants;
- power system control and operation;
- the organization of electricity markets, the changes currently taking place, and the developments that could lead to alternative power systems in the future.

Inside, you will find appendices that support the key text, supplying information on the modeling of power system components and including basic equations derived from Maxwell's laws. Numerous practical examples, case studies and illustrations, demonstrate the theory, techniques and results presented in the text, and accompanying Powerpoint slides are available on a supplementary website.

With its pragmatic approach, *Power System Essentials* is ideal for senior undergraduate students in electrical engineering who require an up-to-date overview of the subject. This book also acts as a concise reference, suitable for postgraduates and professionals from a range of disciplines who would like to work in this field.



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Electrical Power System Essentials By Pieter Schavemaker, Lou van der Sluis Bibliography

- Sales Rank: #2599973 in Books
- Published on: 2008-05-27
- Original language: English
- Number of items: 1
- Dimensions: 9.82" h x .96" w x 6.95" l, 1.59 pounds
- Binding: Hardcover
- 340 pages

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Editorial Review

From the Back Cover

Electrical Power System Essentials

Electrical power systems can be regarded as one of the most complex systems designed, constructed and operated by man. Of course it is a fact that the majority of the hardware that makes the generation, transmission and distribution of electricity possible, has not changed in essence since their first appearance more than a hundred years ago. In the design and construction of transformers, motors, generators, cables, and transmission lines, it is better to speak of evolution rather than revolution. As a result of this evolution, many advanced technologies and techniques are applied in today's power system.

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About the Author

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Pieter H. Schavemaker is currently an Assistant Professor in the Faculty of Electrical Engineering, Mathematics and Computer Science at Delft University of Technology. He has been with the Power Systems Laboratory since 1996, and obtained his PhD in Electrical Engineering in 2002. He teaches courses on power systems analysis to undergraduate electrical engineering students, and has a number of years' experience teaching students and giving courses to people in industry. He has also worked in industry with ABB (The Netherlands) in the field of substation control systems, and he is now working on research projects for Tennet, the Dutch technical standards organization. In 2004 he won the Prize Paper Award (along with L. van der Sluis) from the Power Engineering Education Committee of the IEEE Power Engineering Society, and his research interests include power system transients and power system calculations.

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Lou van der Sluis is currently a Professor in the Power Systems Department at the Delft University of Technology. Along with Professor Schavemaker, he teaches power systems analysis to undergraduate students, and also tutors practitioners working in the power systems industry. He has authored the book *Transients in Power Systems* which was published by Wiley in 2001, and won the Prize Paper Award (with P. Schavemaker) from the Power Engineering Education Committee of the IEEE Power Engineering Society. He is a senior member of IEEE and convener of CC-03 of Cigre. His research interests include analyzing the transient recovery voltages in medium and high voltage networks.

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