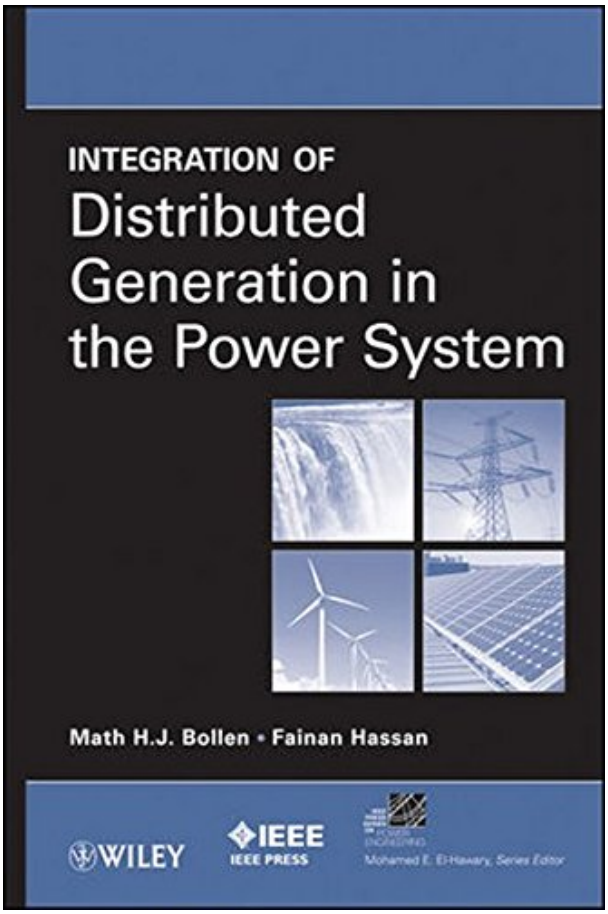
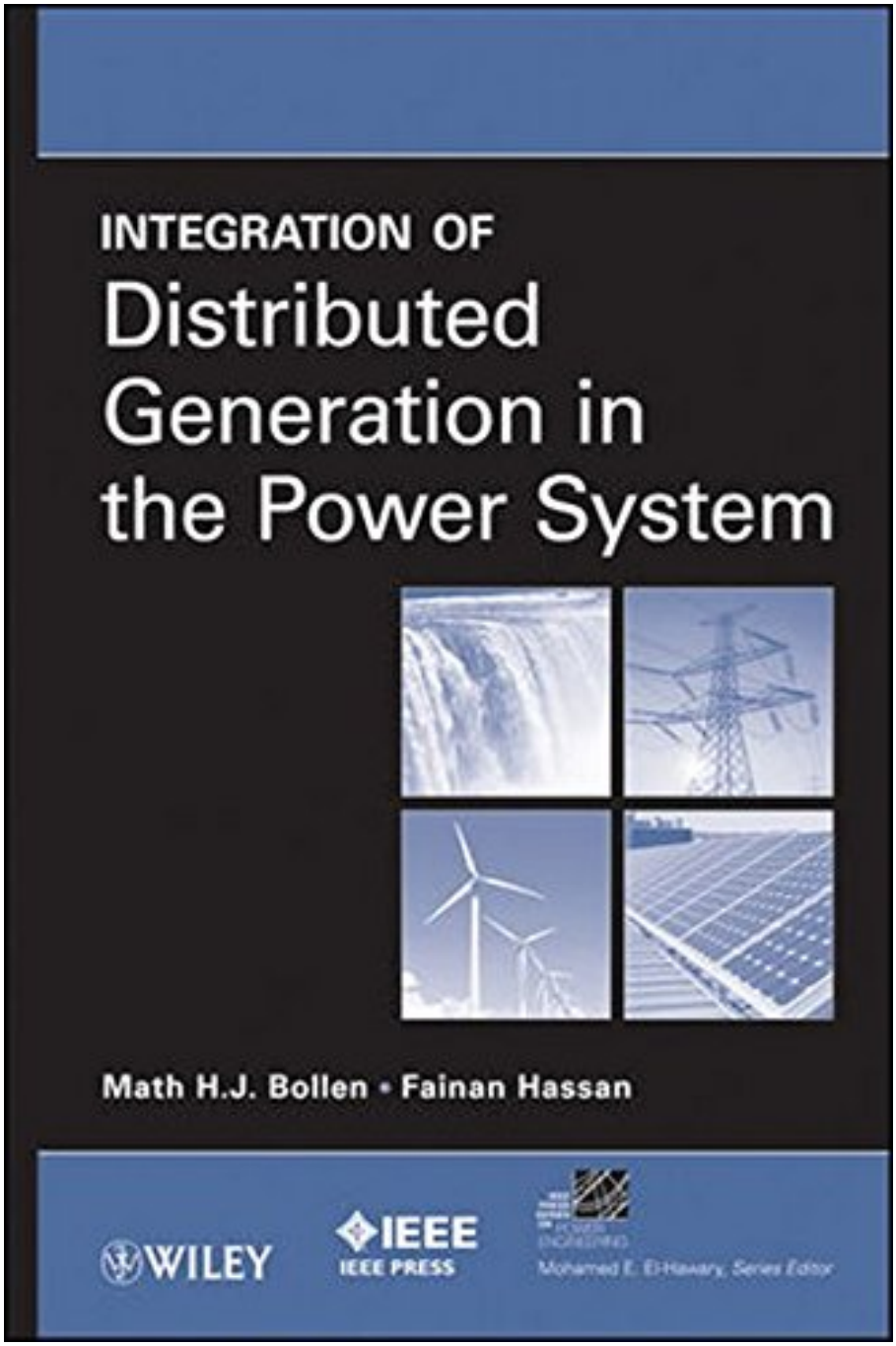
INTEGRATION OF DISTRIBUTED GENERATION IN THE POWER SYSTEM BY MATH H. BOLLEN, FAINAN HASSAN





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Review

The author’s organization of the book is superb, and the write-up with appropriate examples is very clear. The book will be useful to those who have good prior knowledge in power engineering including power electronics and renewable energy sources. The book offers a very comprehensive discussion of modern power system operation with distributed generation by renewable energy sources. It describes sources of energy, power system performance, overloading and losses, voltage variations, power quality disturbances, faults and protection, and transmission with distributed generation. Many examples are given with emphasis of European system. It is an excellent reference book for modern power engineers.
—Dr. Bimal K. Bose, Condra Chair of Excellence/Emeritus in Power Electronics, University of Tennessee

From the Back Cover

A forward-thinking power-system viewpoint on the increased integration of distributed generation into the grid

Alternative, renewable sources of energy are often referred to as "distributed generation" (DG). The electric power system plays an essential role in transporting and allowing the use of this energy, and much controversy surrounds the question of the true hosting capacity of the grid when it comes to DG. This book introduces systematic and transparent methods for quantifying the effect of DG on the power system, either at a specific grid location or in the grid as a whole. It shows how to calculate—and increase—the hosting capacity for different types of networks and various types of DG, with emphasis on wind power, solar power, and combined heat and power.

This book is the first to explain the background of the "hosting capacity approach"—using the existing power system as a starting point and considering how DG changes the performance of the system when no additional measures are taken—and to provide numerous examples. The heart of the book outlines the

problems surrounding the integration of DG in detail: increased risk of overload and increased losses; increased risk of overvoltages; increased levels of power-quality disturbances; incorrect operation of the protection; and the impact on power-system stability and operation. Specific solutions are discussed, ranging from building more lines and using power-electronics control to smart grids and microgrids. Theoretical models and research results are also presented.

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Integration of Distributed Generation in the Power System is an important resource for engineers and researchers working on power systems and the connection/integration of DG to the power system; equipment manufacturers; wind-power developers; government regulators; and undergraduate and postgraduate students in the power engineering and energy fields.

About the Author

MATH H.J. BOLLEN, PhD, is Senior Specialist with STRI AB, Gothenburg, Sweden; Professor in Electric Power Engineering at Luleå University of Technology, Skellefteå, Sweden; and a technical expert with the Energy Markets Inspectorate in Eskilstuna, Sweden. He is a Fellow of the IEEE.

FAINAN HASSAN, PhD, is with the Alstom Grid (previously Areva T&D), Research & Technology Centre, Stafford, United Kingdom. A member of the IEEE, she has also worked as a seniorengineer for STRI AB, Gothenburg, Sweden.

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The integration of new sources of energy like wind power, solar-power, small-scale generation, or combined heat and power in the power grid is something that impacts a lot of stakeholders: network companies (both distribution and transmission), the owners and operators of the DG units, other end-users of the power grid (including normal consumers like you and me) and not in the least policy makers and regulators.

There is a lot of misunderstanding about the impact of DG on the power grid, with one side (including mainly some but certainly not all, network companies) claiming that the lights will go out soon, whereas the other side (including some DG operators and large parks of the general public) claiming that there is nothing to worry about and that it's all a conspiracy of the large production companies that want to protect their own interests and keep the electricity price high.

The authors are of the strong opinion that this is NOT the way one should approach such an important subject as the integration of new, more environmentally friendly, sources of energy in the power grid. With this book the authors aim to bring some clarity to the debate allowing all stakeholders together to move to a solution. This book will introduce systematic and transparent methods for quantifying the impact of DG on the power grid.

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