

Reliability Evaluation of Power Systems

Second Edition

Reliability Evaluation of Power Systems

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Roy Billinton

*University of Saskatchewan
College of Engineering
Saskatoon, Saskatchewan, Canada*

and

Ronald N. Allan

*University of Manchester
Institute of Science and Technology
Manchester, England*

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Preface to the first edition

This book is a sequel to *Reliability Evaluation of Engineering Systems: Concepts and Techniques*, written by the same authors and published by Pitman Books in January 1983.* As a sequel, this book is intended to be considered and read as the second of two volumes rather than as a text that stands on its own. For this reason, readers who are not familiar with basic reliability modelling and evaluation should either first read the companion volume or, at least, read the two volumes side by side. Those who are already familiar with the basic concepts and only require an extension of their knowledge into the power system problem area should be able to understand the present text with little or no reference to the earlier work. In order to assist readers, the present book refers frequently to the first volume at relevant points, citing it simply as *Engineering Systems*.

Reliability Evaluation of Power Systems has evolved from our deep interest in education and our long-standing involvement in quantitative reliability evaluation and application of probability techniques to power system problems. It could not have been written, however, without the active involvement of many students in our respective research programs. There have been too many to mention individually but most are recorded within the references at the ends of chapters.

The preparation of this volume has also been greatly assisted by our involvement with the IEEE Subcommittee on the Application of Probability Methods, IEE Committees, the Canadian Electrical Association and other organizations, as well as the many colleagues and other individuals with whom we have been involved.

Finally, we would like to record our gratitude to all the typists who helped in the preparation of the manuscript and, above all, to our respective wives, Joyce and Diane, for all their help and encouragement.

Roy Billinton
Ron Allan

*Second edition published by Plenum Press in 1994.

Preface to the second edition

We are both very pleased with the way the first edition has been received in academic and, particularly, industrial circles. We have received many commendations for not only the content but also our style and manner of presentation. This second edition has evolved after considerable usage of the first edition by ourselves and in response to suggestions made by other users of the book. We believe the extensions will ensure that the book retains its position of being the premier teaching text on power system reliability.

We have had regular discussions with our present publishers and it is a pleasure to know that they have sufficient confidence in us and in the concept of the book to have encouraged us to produce this second edition. As a background to this new edition, it is worth commenting a little on its recent chequered history. The first edition was initially published by Pitman, a United Kingdom company; the marketing rights for North America and Japan were vested in Plenum Publishing of New York. Pitman subsequently merged with Longman, following which, complete publishing and marketing rights were eventually transferred to Plenum, our current publishers. Since then we have deeply appreciated the constant interest and commitment shown by Plenum, and in particular Mr. L. S. Marchand. His encouragement has ensured that the present project has been transformed from conceptual ideas into the final product.

We have both used the first edition as the text in our own teaching programs and in a number of extramural courses which we have given in various places. Over the last decade since its publication, many changes have occurred in the development of techniques and their application to real problems, as well as the structure, planning, and operation of real power systems due to changing ownership, regulation, and access. These developments, together with our own teaching experience and the feedback from other sources, highlighted several areas which needed reviewing, updating, and extending. We have attempted to accommodate these new ideas without disturbing the general concept, structure, and style of the original text.

We have addressed the following specific points:

- A complete rewrite of the general introduction (Chapter 1) to reflect the changing scenes in power systems that have occurred since we wrote the first edition.

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- Inclusion of a chapter on Monte Carlo simulation; the previous edition concentrated only on analytical techniques, but the simulation approach has become much more useful in recent times, mainly as a result of the great improvement in computers.
- Inclusion of a chapter on reliability economics that addresses the developing and very important area of reliability cost and reliability worth. This is proving to be of growing interest in planning, operation, and asset management.

We hope that these changes will be received as a positive step forward and that the confidence placed in us by our publishers is well founded.

Roy Billinton
Ron Allan

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