for each application that includes STATCOM, back-to-back HVDC conversion system, and variable speed wind power system. The analysis of each application continues with the simplified systems and associated mathematical processes developed in the first part of the book. Two appendices are included. Appendix A is the mathematical development of the phasor representation for symmetrical three-phase electric machines. Appendix B presents per-unit values to be applied for VSC systems. A comprehensive list of references is included for those who wish to dig deeper into VSC technology.

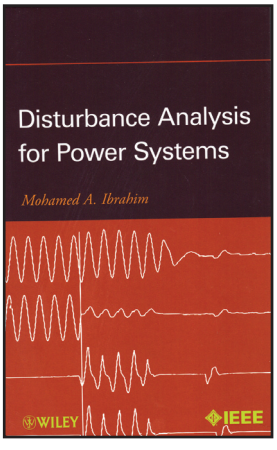
It is feared that the simplified models used by the authors to arrive at their developments for VSC controls will be inadequate for real systems involving electrical machines. However, there is value in the basic but useful approach presented in the book, particularly for the benefit of graduate students who may be more apt at understanding the equations and need to comprehend VSCs. On the other hand, the mathematical justifications in the book would become excessively complex if real-life systems were applied that included nonlinearities, harmonic resonances, and complex ac systems. These can be separately examined using the latest versions of electromagnetic transient's type programs.

Mathematical symbols used in the text are not always easily understood, despite the fact that they are extracted from valid equations. These symbols are probably adequate for a graduate textbook but many practicing engineers may find it more challenging to understand their significance. Nevertheless, the authors are to be applauded for their efforts in tackling a very challenging subject. Significant advances in VSC and control technology for application in electric power systems have come forward in the short time since this book was released. It is anticipated that these will be presented in due course.

—Dennis Woodford

Disturbance Analysis for Power Systems

By Mohamed A. Ibrahim, IEEE–Wiley, ISBN 978-0-470-91681-0



The book, by Mohamed Ibrahim, has three introductory chapters about the need for tools, techniques, and issues involved in disturbance analysis ranging from the functioning of digital fault recorders to symmetrical components and COMTRADE. Even the first three chapters have small case studies to illustrate the point of the section. There is a chapter

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on phenomena related to faults and one on power system phenomena and their impact on protection. The fault phenomena chapter has complex relaying situations not encountered in standard texts such as section 2.23 "Delayed Clearing of a Pilot Scheme due to a Delayed Communication Signal." The power system phenomena chapter also has rare protection events such as 3.39 "Mutual Coupling Phenomenon Causing False Tripping of a High Impedance-Impedance Bus Differential Relay During a Line Phase-too-Ground Fault."

The remaining five chapters contain more than 80 larger case studies based on the author's 40 years of experience organized by disturbances involving generators, transformers, overhead transmission lines, cables, and breaker failure protection. Each case has substantial evidence of the event itself with one-line diagrams and DFR records. A typical case study is presented in four to ten pages with numerous figures along with a careful analysis of the event, suggested corrective action, and issues raised by the event. It is a tour de force in the true sense of the word. It is not clear there are very many others who could have written the book. Mr. Ibrahim is uniquely qualified to write such a book and has obviously gone to great lengths to produce this encyclopedic book.

The book should be on the shelves of those in the industry that carry on the task of analyzing such disturbances.

—James Thorp