



by
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**Engineering Your Retirement
— Retirement Planning for
Technology Professionals**

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Planning for retirement, especially for engineers and technologists, never seems to be a high priority. Many engineers would rather discuss the latest technical problem rather than review their financial plans for retirement. This is even more true for the younger engineers far from retirement. But, it is the wise person that plans early and starts to save early on for retirement.

This book provides sound advice for engineers, scientists, and mathematicians planning retirement. It answers the fundamental questions such as how much money will I need to retire, how long will it take to accumulate this money, and what types of investments are available to achieve these goals. This book is written by an engineer for engineers and scientists. The author has included many charts, graphs, and equations, that engineers and scientists

like to see, illustrating key points and facts such as life expectancy and equations for calculating how long it will take to save a given amount of money. He gives a lot of good advice, such as living below your means and taking care of emergency cash reserves and insurance first. Then he discusses the “ins” and “outs” of various types of investments that could be of interest to many technical professionals. These include cash, social security, stocks, bonds, real estate, and mutual funds. Next he covers how to plan retirement using these investment instruments for eliminating “bad” debit, discussions on various investment issues (diversify, fees, market timing, risk versus reward, portfolio rebalancing), various tax-advantaged accounts, and tax considerations. He also gives the reader ideas to think about what you would do when you retire. He goes through a list of many different categories such as part-time work, volunteering, recreation, health, and self-improvement. The final chapter discusses a wide range of other things to consider including places to live, other income sources, taxes, heirs, and references for further reading. The author has a web site, which pretty much follows the book, and many other web sites for getting useful information on retirement planning.

Although considering tax strategies is important, the downside about including taxes in a book is that the tax code can and does change over time. The author does discuss tax-advantaged accounts such as education plans 529 and Coverdell plans. Since the writing of this book, the new pension law has been approved and will significantly change these and other plans in future years. Obviously, the reader needs to check the latest tax code to determine the best approach.

Although this book could be used by virtually any one in any profession, its style is geared toward technically-oriented people from the style of writing and the numerous illustrations and use of equations. But, everyone would benefit from reading and taking action based on the advice given in this book. A must have book, well worth the money, for all our readers.

**Electric Power Distribution
Equipment and Systems**

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326 p. - \$94.95 (Hardcover), 2006

In this book you will learn about the important factors that can affect power distribution system reliability and how to improve system reliability and quality. The entire focus is on distribution, with an excellent review of the fundamentals of distribution systems given in the first chapter. The focus of the system layouts and voltages are predominantly for North America, but the background does detail the differences in distribution systems between North America and Europe.

The author describes the major components in the distribution system that can fail, with a chapter for each component. There are chapters on overhead lines and underground lines that include coverage on cable fault capacity, cable reliability, cable design, and cable impedance. Other chapters cover transformers, voltage regulation, and capacitors.

Although there are many illustrations, tables of data, and well-written descriptions, there are still many equations to provide the engineer with not only a good understanding of the subject but also useful information to make design judgments to improve reliability. The reader will gain a better understanding of issues that can create failures or unreliable power caused from distribution components. For example, the author details how transformers can create a high inrush that can cause switches, breakers, or controllers to trip or even fail, depending on the state of the remnant magnetization of the transformer

core. He goes on to explain the factors that influence the inrush and ways to reduce the problem. This being only one example of many that illustrates the essence of the book. There are many examples of wye connections and delta connection variations with examples of the different value of fault currents and the various issues associated with transformer configuration. There are also numerous references at the end of each chapter for further study.

An excellent book for anyone wanting to know about the fundamentals of power distribution systems and to understand the potential problems that can occur and solutions to improve reliability of the system. A book well worth checking out!

The Pleasures of Pi, e and Other Interesting Numbers

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264 p. - \$38 (£22) (Hardcover), 2006

This is an interesting book on mathematics. The author presents various mathematical series and proofs in an easy to comprehend and fun style. With the book broken into two sections, the first section being a very simple series that could be read and understood by most. The author points out patterns and rhythms of many equations such as infinite series that converge and ones that do not. He builds upon many of the series to show how many series come from simpler series, including the Pi series, e-series, and other interesting series. These are presented in a simple and fun way to appeal to even young children or adults. The second half of the book covers “easy” proofs, “less easy” proofs, and not so easy proofs. These are much more rigorous and are for more advanced study. They basically consist of proving

many of the series formulas from the first half of the book as well as others.

This is meant to be an entertaining read on a traditionally tedious subject – mathematics. Anyone who is interested in mathematics and number series would find this book to be informative, enlightening, and entertaining.

Power Electronics Design — A Practitioner’s Guide

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272 p. - \$62.95 (Hardcover), 2005

This author has presented a wealth of practical information for power electronic and power engineers. From power components to power electronic controls, he has produced a book that is filled with his 50 years of industrial design experience with Westinghouse and Robicon Corp. Unlike so many technical books, this book is interesting to read, not only for the technical content but also for the interesting history behind the designs, such as the reasons for the present voltage values in use today or the use of 60 Hz rather than some other frequency. Lots of interesting history, especially from the South Western PA and Northeast area at the turn of the century.

This book primarily focuses on the application of power electronics to large motor drives, power supplies, power conversion equipment and many other applications. Although the book details circuits and power components, the biggest benefit of this book for the reader is in the details given about the differences in construction of various power components and why some components are better suited

than others for a particular design. For instance, the use of extended foil capacitors for low inductance snubber applications or Belleville washers used to ensure reliable busbar connections are detailed. There is advice on a wide variety of component selection and circuit topography for many applications. Component behavior and selection include transformers and reactors, motors, and rectifiers. There are practical circuits on phase control, voltage and current sharing, pulse converters, and switch-mode systems. He also details power factors and harmonic effects on components and system behavior as well as thermal considerations. Some of the specific applications cover areas from motor drives, the glass industry, plasma arcs, superconducting energy storage, tokamaks, and multitap switching.

This is a very well written, interesting book filled with practical design advice and circuits useful to power engineers and power electronic designers. It has lots of good design information to save the designer time and money by learning about what has worked and not worked in the past. If you work in the area of power electronics, this is an excellent book to study.

Experimental Techniques for Low-Temperature Measurements

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This text is about how to design and build low-temperature cryostats, measuring superconductor properties, and other experimental techniques used in low temperature measurements (mainly liquid helium). This book is an experimentalist dream come true. The author actually describes the nitty-gritty details necessary to being able to actually build and use these devices and testing methods described. So many books leave out the “little” details that the book is merely good for academic purposes only. This book is not the case.

The author has done a great job in detailing many of the methods and design techniques used in low-temperature measurement technology for superconductors. The book comes in three main sections: the designing and building of a cryostat, mounting/contacting superconducting samples, and making measurements/analyzing the data.

Chapters include extensive design details and practical techniques along with many useful graphs of system behavior and material properties under various conditions. Each chapter not only provides design details but also includes many tips on things not to do. He also includes the theoretical background necessary to understand the design or testing method being described.

The first section details background information on cryostats, cooling methods, and heat transfer. Then details are presented on cryostat construction, including, as an example, welding techniques, material properties, vacuum techniques, and mechanical motion at low temperatures. The material property selection not only showed exactly the best materials to use for these applications but reasons why these are such a good choice.

The second section on sample holders and making contacts begins with basic four-point probe measurement techniques. I found this section on wiring and electrical connections most interesting because of the details on specific materials and cleaning methods used to obtain low-contact resistance to superconducting samples. Also, the author described methods for making contact resistance measurements on superconducting samples. Other methods included soldering connections, high current lead properties, and wire selection for low temperatures.

The third section on critical-current measurements and data analysis includes test methods and instrumentation setup necessary to measure the critical-current density and magnetic field measurement methods. All the basic parameters that affect the critical-current density, temperature, strain, and magnetic field are discussed in detail.

Some of the other benefits of this reference book are that the author lists sources for hard-to-find items and has an appendix filled with material properties and more data for cryostat design.

This well-written, outstanding book is intended for a person working in the low-temperature superconductor measurement field. It also can be interesting and useful to the general experimentalist, including engineers in industry, graduate students, materials scientists, and other researchers who may use low-temperature (helium) equipment or test techniques or material behavior at low temperature.

Short-Circuit Currents

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One of the many tasks performed by power engineering is calculating short-circuit currents in power systems to provide design parameters and sizing and selection of power distribution components to ensure safe and reliable power. There are many factors that can affect short-circuit current.

This book provides the reader with the theoretical background needed to perform such calculations under various situations. The author uses symmetrical components to solve short-circuit equations. He begins the book with background in transformation of impedance, equivalent circuits, and per unit system, the basics but still important to understand. Each chapter then details how to calculate three-phase, short-circuit currents under various conditions. These conditions are high-voltage systems, neutral earthing, low-voltage systems, double earth-faults, and dc systems. There also is coverage on the effects of the fault on thermal and mechanical considerations. Equations are given to calculate temperature rise, electromagnetic forces, and conductor oscillation on both ac and dc systems. In addition, there is data useful for short-circuit calculations given on various power system components, including transformers, generators, overhead lines, cables, motors, reactors, and resistors. Although, of course, it is not possible to list all equipment, examples show what

is important and necessary parameters needed to calculate short-circuits.

One shortcoming of the book is that there is no Monte Carlo analysis or computer analysis presented. It is important for short-circuit analysis that the faults be calculated under a wide variety of situations with various fault closing angles, variations in equipment impedance, and various loading situations. All these can lead to a range of short-circuit currents that can easily be simulated numerically using a computer.

This still would be a good book for power engineers and power system designers who need to understand how components in a power system affect short-circuit fault currents. This book also could be used by power engineering students, but only as a supplemental book, unless the instructor made up questions because it does not have any questions in the book.

Productive Performance Appraisals, Second Edition

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Giving or receiving a performance appraisal can be difficult and uncomfortable for many. Performance appraisals can be viewed by many employees as a way to "keep tabs" on you and to make sure that you are doing enough work. However, a performance appraisal is intended to benefit both the employer and the employee if conducted properly. Frequently, performance appraisals can end up confrontational if the one giving the appraisal says the wrong things. This can lead to animosity and a poor working relationship. A good performance appraisal should foster a working relationship as well as assessing how well goals were met and how well the employees advanced their developmental goals.

This book guides the reader through an effective performance appraisal, giving the reader clearly written advice on essential topics. The highlights include how to

prepare before the meeting, structuring the appraisal, how to ease tensions, making the appraisal a collaborative effort, how to strengthen your working relationship, and how to handle performance or conduct problems. I found this book to have an easy-to-read conversational style, with many example "conversations" that could be very useful in an appraisal. There is very good advice on how to handle a variety of situations. But, obviously, every individual and situation can be different than described in the book. However, the way the book is written provides many ideas on how to handle many situations and gives the reader the general idea on how to get the most out of a performance appraisal.

If you give performance appraisals or are an employee who receives appraisals, it is well worth the low price of this book to get a better idea of what the boss is expecting during a performance appraisal.

Scanning Auger Electron Microscopy

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Surface science and the study and measurement of the elements on the surface of a material are very important areas of research. Auger electron microscopy is one such method used to measure elemental materials on surfaces. Along with ion etching, Auger electron microscopy can be used to measure the composition of a material as a function of depth. However, there are many intricate details that can cause the misinterpretation of results and an incorrect conclusion.

This book describes in detail the Auger electron process, instrumentation, methods, and applications of Auger microscopy. It begins with an introduction to Auger microscopy and compares it to other surface measurement methods (EDX, XPS, and SIMS). This is followed by the theory

of the Auger process and instrumentation. Then it discusses the limits to the spatial resolution and a very useful part about methods used to separate chemical information from confusing imaging artifacts due to sample properties. There is good practical information on sample geometry and the methods used to collect and display the data. There are software tools that are not canned software but rather descriptions of the algorithm used to interpret the data collected. Some examples include: correcting for the background, correcting surface topography, and phase mapping. Although not prewritten, this way of describing the software gives the reader a better understanding of the methods actually used in software rather than just blindly using a canned software program. And, because most microscopes are unique, the software would have to be written for that particular device. There are also image quantification methods described as well as applications in the areas of metallurgy and semiconductor characterization.

A great deal of theoretical and practical information is presented on Auger microscopy. The authors have gained a great deal of knowledge in this area by designing and building their own microscopes — three all together. A very good aspect of this book is the technical depth and the descriptions of the advantages as well as the limitations. One drawback of the book is that some of the descriptions pertain only to the microscope designed and built by the authors. However, Auger microscopes are generally custom built and the authors' descriptions were generally universal.

Researchers in surface science who need to learn about the fundamentals of Auger microscopy would find this book useful as well as those who use Auger microscopy in their field of work. They would learn more about the advantages and limitations of the method to be more productive and get more useful information from the results.



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