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## Book reviews

N. Ida, *Engineering Electromagnetics*, Springer, 2000, 1215 pp., £82.50.

*Engineering Electromagnetics* is a new text aimed primarily at undergraduate teaching although it could easily serve as a reference text for those interested in the area. Electromagnetics is a notoriously unpopular topic with many engineering undergraduates. There are several main reasons for this: the subject is inherently mathematical; its treatment is often abstract; and it is commonly viewed as a support course for other mainstream engineering subjects. This text however provides a very comprehensive theoretical treatment of electromagnetics whilst attempting to treat the subject as a primary topic itself rather than playing a subordinate role to other courses. This is achieved by including a large and varied number of experiments and practical engineering applications, something sadly lacking in many other texts.

The book contains a rigorous treatment of all the main theoretical aspects of electromagnetics. Chapters 1 and 2 are devoted solely to vector algebra and calculus. Chapters 3 and 4 introduce electric fields and potential whilst Chapters 5 and 6 extend this into the analytical and numerical solution of electric field problems. Numerical solution techniques (finite difference and finite element) are a particular topic that is often omitted from many undergraduate textbooks. Chapter 7 concentrates on the treatment of steady current flow. Static magnetic fields and magnetic materials are introduced to the reader in Chapters 8–10. Chapter 11 is devoted to the development of Maxwell's equations whilst Chapters 12 and 13 continue the development into electromagnetic waves, propagation, reflection and transmission. The remaining six chapters focus on transmission lines including transients, waveguides and antennas. The breadth of information is indicative of the volume of material contained in the text. Each chapter contains many illustrations and examples, concluding with sections containing experiments with explanations, and applications and problems.

This is without doubt an impressive and comprehensive text. The price unfortunately puts it beyond the pockets of most undergraduates. However it is a book that would be a useful addition to any library collection and one that I personally have found to be extremely useful in the development of undergraduate courses in electromagnetics.

A. C. Smith *UMIST*

G. Kesidis, *ATM Network Performance*, 2nd edn, Kluwer Academic Publishers, 1999, 206 pp., £80.00.

This book describes the performance of Broadband Integrated-Services Digital Networks (B-ISDNs) based on Asynchronous Transfer Mode (ATM). The main focus of the book is on the quality-of-service requirements for individual connections.

It is composed of eight short chapters, with chapter 1 discussing B-ISDN traffic and ATM standards and protocols, and evolving Internet. Chapter 2 is devoted to the discrete-time queues with constant service rates covering large deviations effective bandwidth, and external and peak rate constrained traffic. Bandwidth scheduling (round-robin, and virtual finishing times) for a single node and its performance characteristics are outlined in chapter 3. Chapter 4 is all about end-to-end delay bounds and buffer sizing for lossless transmission, buffer sizing for idling schedulers, controlling cell delay jitter, and extension of arbitrary virtual path connections. Available bit rate traffic parameters, resources management cells and

delay, buffer sizing, excess bandwidth and distributing excess bandwidth fairly, evaluating flow control policy are covered in chapter 5. Chapter 6 discuss ATM generic single-stage non-blocking crossbar switches, with the focus being on the switches that have a guaranteed-rate property and are feasible at high data rates. Input/output-buffered ATM switches, scalability, and multicast scheduling for input-buffered switches are also covered in this chapter. Resources (quality of service, and end-to-end) provisioning for pre-recorded video are dealt with in chapter 7. Finally, chapter 8 covers resources management and provisioning for real-time variable bit rate video teleconferencing that is MPEG encoded. Quality of service requirements of the video flow, bandwidth requirements at each hop, and on-line traffic measurements are also covered in this chapter.

Each chapter contains discussion and additional references and exercises. Solution, glossary of acronyms and short forms, and references for selected exercises are also given. The approach adopted is highly mathematical, based on proposing theorem and proof with very few illustrations and results. All of the required background in discrete-time queueing theory is provided. It is not an easy book to read and therefore may find limited readers. As a teaching book it is suitable for postgraduate courses only.

Z. Ghassemlooy *Sheffield Hallam University*

#### J. Larminie and A. Dicks, *Fuel Cell Systems Explained*

This book sets itself the difficult goal of describing the behaviour and future potential of fuel cell systems. This is a huge body of material and it is difficult to undertake this in 300 pages without either assuming a high level of prior knowledge or presenting the material in an simplified manner. The book we are assured on the jacket cover however assumes no prior knowledge.

*Fuel Cell Systems Explained* does its best to avoid the twin traps of being too technical or too trite. Fuel cell technologies are compared and the remaining system elements such as for example hydrogen storage, motors and power electronic interfaces are discussed. Enough information is presented so that the reader has an overview of the core concepts of the elements of the system. However for anything more than this one has to refer to other texts. The level of the discussion sometimes does make assumptions about the knowledge of the reader. Also the selection of material is sometimes open to question. Why for example spend two-and-a-half pages discussing induction motors yet three discussing the much less widely used switched reluctance motor?

On the whole the book sets itself a very high goal and does not always quite achieve it. Nevertheless it is a useful introduction to the subject matter from a systems perspective and a useful addition to an electrical engineer's reference library.

Mike Barnes *UMIST*