system architectures are compared. Phase noise properties and the alternative (or concurrent) use of PLL circuitry are also discussed. Chapter 8 (by W.A. Shiroma, E.W. Bryerton, and Z. Popovic) deals with another important class of devices in the ICAM panorama: oscillator grids and arrays. Within the framework of an infinite-array simplification, circuit-oriented design methods are presented together with examples of practical realizations, which clearly illustrate the potentials of these systems for spatial power combining at millimeter-wave frequencies through quasi-optical techniques.

The book continues with the presentation of two important application areas, which are expected to take the greatest advantage from adoption of ICAM-based solutions. The first one, dealt with in Chapter 9 (by L.R. Whicker), concerns active phased-array antennas for radar and space communication applications. In this class of systems, the monolithic integration—already successfully applied to T/R circuits—can be further extended to include also the radiating element, thus obtaining the top-most advanced implementation of the ICAM concept. State-of-the-art in this field is presented, showing that the degree of integration already attained is limited, but that significant achievements can be expected in the near future. The second application area investigated pertains to the realization of broadband wireless access devices for "radio on fiber" telecommunication systems, as discussed in Chapter 10 (by H. Ghafouri-Shiraz). After an introduction to this new, emerging technology and the presentation of the best suited system configurations (including millimeter-wave signal generation by optoelectronic means), it is shown that the use of IC-antenna modules is essential to satisfy constraints on size, weight, and cost for the remote nodes of this pico-cellular network. Examples of practical realizations are then presented, illustrating that the integration concept can be further extended here to include the optoelectronic interface; e.g., by incorporating a photoHBT detector/amplifier into the ICAM structure.

The concluding Chapter 11 (by P.S. Hall and K.C. Gupta) is devoted to summarizing the analysis methods presented and to highlighting the problems raised but not completely solved, as well as providing an indication of what can be expected to be the evolution of ICAMs in the near future.

Overall, this book is informative and well written, and it exhibits a good balance between exposition depth and width. Furthermore, one can affirm that the stated goal of "raising the profile of the topic" has been achieved, since the reader's curiosity on ICAM technology and design issues is undoubtedly stimulated by the proposed blending of successful achievements and problems still open for investigation. As such, the book can be recommended both as a textbook for graduate-level courses in electronics as well as a reference for microwave engineering professionals. It can be also suggested to researchers already involved in some of the subtopics addressed by the book, who should find in its reading the incentive for further extending the interdisciplinary aspects of their own work, with the goal of developing even more comprehensive and "integrated" simulation and design methods.

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RIDGE WAVEGUIDES AND PASSIVE MICROWAVE COMPONENTS

By J. Helszajn, M. McKay, and M. Caplin. IEE, 2000, 327 pp.

This book is the 49th volume in the *IEE Electromagnetic Waves Series*, which is edited by Professor P.J.B. Clarricoats and Prof. E.V. Jull. The author of this book is J. Helszajn; M. McKay is the co-author of the chapters 5, 6, 7, 12, and 14, and M. Caplin is the co-author of chapter 3. It is published by the Institution of Electrical Engineers, London, United Kingdom, and is 327 pages.

This book has 19 chapters. Chapter 1 introduces the fundamental quantities and concepts of the ridge waveguide, such as cut-off space, impedance, and attenuation. Chapter 2 discusses the propagation and impedance of rectangular waveguides. Ridge waveguides are divided into several chapters for different types and theoretical methods. Chapter 3 applies the transverse resonance method to the impedance. Chapters 4 and 5 discusses double-ridge waveguide fields, propagation, attenuation, and the finite-element method. Chapter 6 discusses the finite-element method applied to the single-ridge waveguide. Characterization of discontinuity effects of single ridge waveguides is discussed in Chapter 11. Two other types of ridge waveguides are dielectric loaded and quadruple. The propagation constant and impedance of the dielectric loaded waveguide and its polarization are discussed in chapters 7 and 8. The quadruple ridge waveguide and its Faraday rotation are discussed in chapters 9 and 10. Chapters 12 through 18 discus some passive microwave components: directional coupler, filter, phase-shifter, and circulator etc. Chapter 19 discusses variational calculus, functionals, and the Rayleigh-Ritz procedure as well as the Helmholtz differential equation.

The ridge waveguide is now increasingly used in microwave transmission lines. It can separate the dominant mode and the first-order mode wider than the conventional way. Most passive components in microwave engineering, such as directional couplers, filters, phase shifters, etc., can be realized in the ridge topology, and the ridge waveguide has been getting more attention. This book discusses each type of ridge waveguide and its related passive components. It will be a good reference book for persons working in corresponding subjects.

TURBO CODES: PRINCIPLES AND APPLICATIONS

by Branka Vucetic and Jinhong Yuan, Kluwer Academic Publishers, 2000.

Recently discovered turbo coding techniques are rapidly finding widespread applications in telecommunications, and the book *Turbo Codes: Principles and Applications* by Branka Vucetic and Jinhong Yuan is one of the very few treating this subject extensively and deeply enough. The book is primarily intended for use by engineers and by advanced students. Although it includes basic materials, most of

the content comprises advanced and original materials. Most chapters treat specific topics, and they can be read independently and used for reference.

The book includes many equations illustrated by numerical results from simulations; it is a compilation of various publications. A comprehensive bibliography is provided at the end of every chapter for reference; to help understanding, the fundamental topics are concisely explained, and explanations are often followed by original materials and illustrated by well-selected examples.

The book is organized in ten chapters. Chapter 1 presents a concise refresher on communications systems and to the Shannon fundamental limit. Chapter 2 presents a good overview on blocks coding and introduces several key definitions useful in the following chapters (for example, the weight distribution of a code); it extensively treats the code performance upper bounds. Chapter 3 is a short but rather extensive overview on convolutional codes; it is mostly intended to highlight the specific properties to be used by turbo codes in following chapters. Chapter 4 gets into the gory details about turbo codes principles and design. Chapter 5 treats the decoding of block and convolutional codes, and Viterbi, SOVA, MAP and variants algorithms are explained and respectively complemented by simulation results. A concise comparison between these algorithms in complexity and performance is provided; the fundamental principles of decoding are first explained intuitively, more detailed explanations and equations are provided afterward, and finally they are illustrated on selected examples. Chapter 6 discusses iterative decoding. Chapter 7 treats the interleaver with in-depth analysis of its influence on turbo code performance and describes several variants of interleaver designs. Chapter 8 covers the fading channel, which is essential for radio, satellite, and mobile applications. Chapter 9 considers the turbo coding application for trellis-coded modulation schemes. Finally, Chapter 10 describes applications examples such as 3GPP/WCDMA, CDMA2000, and satellite communications

Overall, I found the book very useful as a reference. It may not be appropriate for casual reading or for someone looking for an introduction to turbo codes. It is intended for specialists looking for state-of-the-art materials.

DIGITAL SIGNAL PROCESSING

By Y. Stein, John Wiley & Sons, 2000.

This book is specially written for computer science students, because the author believes that computer science undergraduates need to learn DSP but about only 75% of available texts target the electrical engineering student. This book gives the student a basic understanding of the theory and practice of DSP, at a level sufficient for reading journal articles and conference papers.

The topics included in this text may, at first, surprise the reader who is used to more conventional DSP texts. This text contains more material than can be actually taught in a single-semester course. The first course could cover most of the material in the early chapters and the remaining subjects may be relegated to a more advanced course. By reading this book you can become familiar with very different advanced topics such as the matched filter, adaptive algorithms, the CORDID algorithm, the Viterbi algorithm, speech compression, and modern modem theory without any problem.

This text is certainly an introduction to DSP because it contains very different topics in DSP, but the topics aren't very deep.

The content of the text can be divided in four different categories. The first part is Signal Analysis. In this part the reader studies signals and their properties, time and frequency analysis, Fourier and Z transforms, and random signals. The second part is Signal Processing Systems. A signal processing system is a device that processes input signals and produces output signals. This part includes the concept of systems, difference equations, filters, system identification, and other concepts that refer to systems. The third part of the text is Architectures and Algorithms. DSP means algorithmic processing and in this part different algorithms are introduced for designing systems; for example, digital filter implementation. The last part of the book is Applications. The applications of DSP in communication and speech processing are mentioned in this part. For instance data communication, PAM, LPC, and CELP coders.

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LABWINDOWS/CVI PROGRAMMING FOR BEGINNERS

By Shahid F. Khalid, Prentice-Hall PTR, 2000.

This book is one of the new volumes of the *Virtual Instruments* series from National Instruments. The CVI in the title of the book stands for "C for Virtual Instrumentation," where C refers to the C computer programming language. The objective of the book is to present to the beginners a tutorial on CVI programming.

Chapter 1 (pp. 1-11) gives an overview of CVI. Chapters 2 (pp. 12-54), 3 (pp. 55-86), and 4 (pp. 87-135) cover various aspects of creating the graphs of instruments and graphical user interface (GUI). Chapter 5 (pp. 137-179) provides the fundamentals of the source code editor and the use of the "debugger." Chapter 6 (pp. 180-233) discusses the creation of various input and output files and the opening of files and the opening of files for writing and reading. Chapter 7 (pp. 235-299) describes the use and the features of one of one of the CVI library functions called list boxes. Chapter 8 (pp. 301-315) describes the process of CVI executables to install and run CVI projects, including also an error-handling program. Chapter 9 (pp. 317-340) introduces the concept and creation of dynamic link libraries to allow the window applications to link the library during run time. Chapter 10 (pp. 341-364) introduces the CVI features of using external compiles. Chapter 11 (pp. 365-426) presents the features associated with GPIB (general purpose interface bus) communication with GPIB-based instruments and devices. Chapter 12 (pp. 427-466) covers communication with instruments using the RS232 interface. There are five appendices. Appendix A (pp. 467-469) contains the step-by-step procedure for installing CVI.