

Ew 101 A First Course In Electronic Warfare Radar Library

This enhanced and fully revised 4th Edition of Radar and Electronic Warfare Principles for the Non-specialist presents a comprehensive set of radar and electronic warfare principles including many of the latest applications with the addition of new EW principles.

This exciting new resource covers various emerging applications of short range radars, including people counting and tracking, gesture sensing, human activity recognition, air-drawing, material classification, object classification, vital sensing by extracting features such as range-Doppler Images (RDI), range-cross range images, Doppler Spectrogram or directly feeding raw ADC data to the classifiers. The book also presents how deep learning architectures are replacing conventional radar signal processing pipelines enabling new applications and results. It describes how deep convolutional neural networks (DCNN), long-short term memory (LSTM), feedforward networks, regularization, optimization algorithms, connectionist This exciting new resource presents emerging applications of artificial intelligence and deep learning in short-range radar. The book covers applications ranging from industrial, consumer space to emerging automotive applications. The book presents several human-machine interface (HMI) applications, such as gesture recognition and sensing, human activity classification, air-writing, material classification, vital sensing, people sensing, people counting, people localization and in-cabin automotive occupancy and smart trunk opening. The underpinnings of deep learning are explored, outlining the history of neural networks and the optimization algorithms to train them. Modern deep convolutional neural network (DCNN), popular DCNN architectures for computer vision and their features are also introduced. The book presents other deep learning architectures, such as long-short term memory (LSTM), auto-encoders, variational auto-encoders (VAE), and generative adversarial networks (GAN). The application of human activity recognition as well as the application of air-writing using a network of short-range radars are outlined. This book demonstrates and highlights how deep learning is enabling several advanced industrial, consumer and in-cabin applications of short-range radars, which weren't otherwise possible. It illustrates various advanced applications, their respective challenges, and how they are been addressed using different deep learning architectures and algorithms.

A practical guide to the principles of radio communications for both civilian and military applications In this book, the author covers both the civilian and military uses of technology, focusing particularly on the applications of radio propagation and prediction. Divided into two parts, the author introduces the basic theory of radio prediction before providing a step-by-step explanation of how this theory can be translated into real-life applications. In addition, the book presents up-to-date systems and methods to illustrate how these applications work in practice. This includes systems working in the HF bands and SHF. Furthermore, the author examines the performance of these systems, and also the effects of noise, interference and deliberate jamming, as well as the performance of jamming, detection and intercept systems. Particular attention is paid to the problems caused by Radio Controlled Improvised Explosive Devices (RCIEDs). Key Features: A practical handbook on the topic of radio communications and propagation Written by an expert in both the civilian and military applications of the technology Focuses on methods such as radio and radar jamming, and radio-controlled improvised explosive devices (IEDs) Contains problems and solutions to clarify key topics

Written by a prominent expert in the field, this updated and expanded second edition of an Artech House classic includes the most recent breakthroughs in vital sign and gender recognition via micro-radar, as well as covering basic principles of Doppler effect and micro-Doppler effect and describing basic applications of micro-Doppler signatures in radar. The

book presents detailed procedures about how to generate and analyze micro-Doppler signatures from radar signals. Readers will learn how to model and animate an object (such as human, spinning top, rotating rotor blades) with movement, simulation of radar returns from the object, and generating micro-Doppler signature. The book includes coverage of the Google project "Soli", which demonstrated the use of radar micro-Doppler effect to sense and recognize micro motions of human hand gesture for controlling devices. It also discusses noncontact detection of human vital sign (micro motions of breathing and heart beating) using radar, another important application of radar micro-Doppler sensors. Detailed MATLAB source codes for simulation of radar backscattering from targets with various motions are provided, along with source codes for generating micro-Doppler signatures and analyzing characteristics of targets.

The fourth book in the bestselling Artech House EW 100 series is dedicated to reviewing legacy threats and discussing new threats which have arisen since Y2K in communications, radar, and IR threats. Like its predecessors, EW 104 presents a series of highly informative and easy-to-comprehend tutorials, along with insightful introductory and connective material that helps you understand how each aspect fits together. This reference starts with a review of the generalities of legacy threats, from the technical point of view, with a focus on what makes the new threats more challenging. Readers are provided with details of threats in three major areas -Communications, Radars, and IR Threats.

This revised and expanded second edition brings you to the cutting edge with new chapters on LPI radar design, including over-the-horizon radar, random noise radar, and netted LPI radar. You also discover critical LPI detection techniques, parameter extraction signal processing techniques, and anti-radiation missile design strategies to counter LPI radar.

The Electronic Warfare Pocket Guide is the perfect companion for any user that needs to access key definitions, concepts, and equations for their work in the field, lab, or even in military theater of operations. While this concise guide fits in almost any pocket, it packs a real punch by providing users the answers to real world electronic warfare problems that come up every day in concept development, technique development, system design, system testing, operational testing, mission planning and operations. It is especially useful (if combined with training) for members of the military who are in combat and need to use EW techniques to counter missile-strikes, improvised explosive devices, and other threats. This booklet could usefully go into the pocket of every pilot, sailor, soldier and marine.

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accessible introduction to the theory and applications of CR, and presents a comprehensive overview of the latest developments in this emerging area. It covers important breakthroughs in advanced radar systems, and offers new and powerful methods for combating difficult clutter environments. You find details on specific algorithmic and real-time high-performance embedded computing (HPEC) architectures. This practical book is supported with numerous examples that clarify key topics, and includes more than 370 equations.

This completely updated second edition of an Artech House classic provides a thorough introduction to the basic principles of electromagnetic wave propagation of radio frequencies in real-world conditions, fully updated by including new achievements in theory and technology. It serves as an invaluable daily reference for practitioners in the field and as a complete, organized text on the subject. This comprehensive resource covers a wide range of essential topics, from the classification of radio waves, electromagnetic wave theory, and antennas for RF radio links, to the impact of the earth surface on the propagation of ground waves, atmospheric effects in radio wave propagation, and radio wave reception. The book explores the propagation of the ground radio waves, namely the waves that propagate in vicinity of the earth's surface (e.g., guided by that interface), without involvement of any atmospheric effects. Specifics of the high-frequency (HF) radio propagation due to reflections from ionospheric layers is studied, based on commonly used models of the ionospheric vertical profiles. Scattering of the radio waves of UHF and higher frequency bands from the random variations of the tropospheric refraction index (from tiny air turbulences) are also considered by using the principles of statistical radio-physics. Analysis of propagation conditions on real propagation paths, including analysis of the power budget of the VHF/UHF link to assure its stability (percentage of availability within observation time frame), terrestrial, broadcast, mobile, and satellite RF links are presented. The engineering design of the cellular networks, including LTE 4G, 5G and upcoming higher generations is explored. HF propagation predictions for extremely long-range links design for commercial and military applications are explained. Packed with examples and problems, this book provides a theoretical background for astrophysical, aeronomy and geophysical instrumentation design.

the tutorials, this authoritative book features a complete set of problems with solutions." --Book Jacket.

This book analyzes the security of critical infrastructures such as road, rail, water, health, and electricity networks that are vital for a nation's society and economy, and assesses the resilience of these networks to intentional attacks. The book combines the analytical capabilities of experts in operations research and management, economics, risk analysis, and defense management, and presents graph theoretical analysis, advanced statistics, and applied modeling methods. In many chapters, the authors provide reproducible code that is available from the publisher's website. Lastly, the book identifies and discusses implications for risk assessment, policy, and insurability. The insights it offers are globally applicable, and not limited to particular locations, countries or contexts. Researchers, intelligence analysts, homeland security staff, and professionals who operate critical infrastructures will greatly benefit from the methods, models and findings presented. While each of the twelve chapters is self-contained, taken together they provide a sound basis for informed decision-making and more

