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Hands-on Math
History of Wireless
Information Security of Highly Critical Wireless Networks
Introduction to Radar Systems
Practical Solar Tracking Automatic Solar Tracking Sun Tracking Автоматическое удержание Солнечная слежения BC □□□□□□□□□□ Hardware Age

Antenna Theory and Design

Directed Energy Weapons is nothing new to mankind, historically the origination of such weapons falls in centuries ago when first time the famous Greek mathematician, physicist, engineer, inventor, and astronomer Archimedes of Syracuse used different mirrors to collect sunbeams and focusing them on Romans fleet in order to destroy enemy ships with fire. This is known as the Archimedes Heat Ray. Archimedes may have used mirrors acting collectively as a parabolic reflector to burn ships attacking Syracuse. The device was used to focus sunlight onto approaching ships, causing them to catch fire. Of course the myth or reality of Archimedes Heat Ray still is a questionable story, but certain experiments with the help of a group of students from Massachusetts Institute of Technology was carried out with 127 one-foot (30 cm) square mirror tiles in October of 2005 that was focused on a mock-up wooden ship at a range of around 100 feet (30 m). The flames broke out on a patch of the ship, but only after the sky had been cloudless and the ship had remained stationary for around ten minutes. It was concluded the device was a feasible weapon under these conditions.

Modern Antenna Design

Since the publication of the second edition of "Introduction to Radar Systems," there has been continual development of new radar capabilities and continual improvements to the technology and practice of radar. This growth has necessitated the addition and updating of the following topics for the third edition: digital technology, automatic detection and tracking, doppler technology, airborne radar, and target recognition. The topic coverage is one of the great strengths of

the text. In addition to a thorough revision of topics, and deletion of obsolete material, the author has added end-of-chapter problems to enhance the "teachability" of this classic book in the classroom, as well as for self-study for practicing engineers.

Antenna Design for Mobile Devices

A while back I wrote two documents called 'Building a Cloud Service' and the 'Convergence Report'. They basically documented my past experiences and detailed some of the issues that a cloud company may face as it is being built and run. Based on what had transpired since, a lot of the concepts mentioned in that particular document are becoming widely adopted and/or are trending towards them. This is a continuation of that particular document and will attempt to analyse the issues that are faced as we move towards the cloud especially with regards to security. Once again, we will use past experience, research, as well as current events trends in order to write this particular report. Personal experience indicates that keeping track of everything and updating large scale documents is difficult and depending on the system you use extremely cumbersome. The other thing readers have to realise is that a lot of the time even if the writer wants to write the most detailed book ever written it's quite simply not possible. Several of my past works (something such as this particular document takes a few weeks to a few months to write depending on how much spare time I have) were written in my spare time and between work and getting an education. If I had done a more complete job they would have taken years to write and by the time I had completed the work updates in the outer world would have meant that the work would have meant that at least some of the content would have been out of date. Dare I say it, by the time that I have completed this report itself some of the content may have come to fruition as was the case with many of the technologies with the other documents? I very much see this document as a starting point rather than a complete reference for those who are interested in technology security. Note that the information contained in this document is not considered to be correct nor the only way in which to do things. It's a mere guide to how the way things are and how we can improve on them. Like my previous work, it should be considered a work in progress. Also, note that this document has gone through many revisions and drafts may have gone out over time. As such, there will be concepts that may have been picked up and adopted by some organisations while others may have simply broken cover while this document was being drafted and sent out for comment. It also has a more strategic/business slant when compared to the original document which was more technically orientated. No illicit activity (as far as I know and have researched) was conducted during the formulation of this particular document. All information was obtained only from publicly available resources and any information or concepts that are likely to be troubling has been redacted. Any relevant vulnerabilities or flaws that were found were reported to the relevant entities in question (months have passed). Feedback/credit on any ideas that are subsequently put into action based on the content of this document would be appreciated. Any feedback on the content of this document is welcome. Every attempt has been made to ensure that the instructions and information herein are accurate and reliable. Please send corrections, comments, suggestions and questions to the author. All trademarks and copyrights are the property of their owners, unless otherwise indicated. Use of a term in this document should not

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Windows Server 2012: Up and Running

Provides tips and techniques on wireless networking, covering a variety of topics, including wireless standards, Bluetooth, hardware, antennas, and wireless security.

Wireless Communications

A practical book written for engineers who design and use antennas. The author has many years of hands on experience designing antennas that were used in such applications as the Venus and Mars missions of NASA. The book covers all important topics of modern antenna design for communications. Numerical methods will be included but only as much as are needed for practical applications.

Wireless Hacks

Discusses how to configure and manage Microsoft Server 2012's expanded capabilities, covering data management, user permissions, networking tools, and data integrity.

Photometrics Handbook

Important new insights into how various components and systems evolved. Premised on the idea that one cannot know a science without knowing its history, *History of Wireless* offers a lively new treatment that introduces previously unacknowledged pioneers and developments, setting a new standard for understanding the evolution of this important technology. Starting with the background—magnetism, electricity, light, and Maxwell's Electromagnetic Theory—this book offers new insights into the initial theory and experimental exploration of wireless. In addition to the well-known contributions of Maxwell, Hertz, and Marconi, it examines work done by Heaviside, Tesla, and passionate amateurs such as the Kentucky melon farmer Nathan Stubblefield and the unsung hero Antonio Meucci. Looking at the story from mathematical, physics, technical, and other perspectives, the clearly written text describes the development of wireless within a vivid scientific milieu. *History of Wireless* also goes into other key areas, including: The work of J. C. Bose and J. A. Fleming; German, Japanese, and Soviet contributions to physics and applications of electromagnetic oscillations and waves; wireless telegraphic and telephonic development and attempts to achieve transatlantic wireless communications; wireless telegraphy in South Africa in the early twentieth century; antenna development in Japan: past and present; Soviet quasi-optics at near-mm and sub-mm wavelengths; the evolution of electromagnetic waveguides; the history of phased array antennas; augmenting the typical, Marconi-centered approach, *History of Wireless* fills in the conventionally accepted story

with attention to more specific, less-known discoveries and individuals, and challenges traditional assumptions about the origins and growth of wireless. This allows for a more comprehensive understanding of how various components and systems evolved. Written in a clear tone with a broad scientific audience in mind, this exciting and thorough treatment is sure to become a classic in the field.

CLOUD AND INTERNET SECURITY

The main aim of this conference is to bring together academicians, researchers, scientists and working professionals to have a brainstorming session on the current trends towards converging technologies related to electrical, electronics, communication and computer engineering

Electronic Imaging in Astronomy

Practical, concise and complete reference for the basics of modern antenna design *Antennas: from Theory to Practice* discusses the basics of modern antenna design and theory. Developed specifically for engineers and designers who work with radio communications, radar and RF engineering, this book offers practical and hands-on treatment of antenna theory and techniques, and provides its readers the skills to analyse, design and measure various antennas. Key features: Provides thorough coverage on the basics of transmission lines, radio waves and propagation, and antenna analysis and design Discusses industrial standard design software tools, and antenna measurement equipment, facilities and techniques Covers electrically small antennas, mobile antennas, UWB antennas and new materials for antennas Also discusses reconfigurable antennas, RFID antennas, Wide-band and multi-band antennas, radar antennas, and MIMO antennas Design examples of various antennas are provided Written in a practical and concise manner by authors who are experts in antenna design, with experience from both academia and industry This book will be an invaluable resource for engineers and designers working in RF engineering, radar and radio communications, seeking a comprehensive and practical introduction to the basics of antenna design. The book can also be used as a textbook for advanced students entering a profession in this field.

Propagation Engineering in Radio Links Design

Provides instructions on how to build low-cost telecommunications infrastructure. Topics covered range from basic radio physics and network design to equipment and troubleshooting, a chapter on Voice over IP (VoIP), and a selection of four case studies from networks deployed in Latin America. The text was written and reviewed by a team of experts in the field of long distance wireless networking in urban, rural, and remote areas. Contents: 1) Where to Begin. 2) A Practical Introduction to Radio Physics. 3) Network Design. 4) Antennas & Transmission Lines. 5) Networking Hardware. 6) Security & Monitoring. 7) Solar Power. 8) Building an Outdoor Node. 9) Troubleshooting. 10) Economic Sustainability. 11) Case Studies. See the website for translations, including French, Spanish, Portuguese, Italian, Arabic, and others, and additional case studies, training course material, and related information

Introduction to RF Propagation

Expanded and updated, this practical guide is a one-stop design reference containing all an engineer needs when designing antennas Integrates state-of-the-art technologies with a special section for step-by-step antenna design Features up-to-date bio-safety and electromagnetic compatibility regulation compliance and latest standards Newly updated with MIMO antenna design, measurements and requirements Accessible to readers of many levels, from introductory to specialist Written by a practicing expert who has hired and trained numerous engineers

Wireless Infrared Communications

Over the last three decades, interest in Infrared (IR) technology as a medium to convey information has grown considerably. This is reflected by the increasing number of devices such as laptops, PDAs, and mobile phones that incorporate optical wireless transceivers and also by the increasing number of optical wireless links available for indoor and

Antenna Engineering Handbook

The book features research papers presented at the International Conference on Emerging Technologies in Data Mining and Information Security (IEMIS 2018) held at the University of Engineering & Management, Kolkata, India, on February 23–25, 2018. It comprises high-quality research by academics and industrial experts in the field of computing and communication, including full-length papers, research-in-progress papers, case studies related to all the areas of data mining, machine learning, IoT and information security.

Sun Tracking and Solar Renewable Energy Harvesting

The gold-standard reference on the design and application of classic and modern antennas—fully updated to reflect the latest advances and technologies This new edition of the “bible of antenna engineering” has been updated to provide start-to-finish coverage of the latest innovations in antenna design and application. You will find in-depth discussion of antennas used in modern communication systems, mobile and personal wireless technologies, satellites, radar deployments, flexible electronics, and other emerging technologies, including 5G, terahertz, and wearable electronics. Antenna Engineering Handbook, Fifth Edition, is bolstered by real-world examples, hundreds of illustrations, and an emphasis on the practical aspects of antennas. Featuring 60 chapters and contributions from more than 80 renowned experts, this acclaimed resource is edited by one of the world’s leading antenna authorities. This edition features all of the classic antenna types, plus new and emerging designs, with 13 all-new chapters and important updates to nearly all chapters from past editions. Antenna Engineering Handbook, Fifth Edition, clearly explains cutting-edge applications in WLANs, automotive systems, PDAs, and handheld devices, making it an indispensable companion for today’s antenna practitioners and developers. Coverage includes:

- Antenna basics and classic antennas
- Design approaches for antennas and arrays
- Wideband and multiband antennas
- Antennas for mobile devices and PDAs, automotive applications, and

aircraft•Base station and smart antennas•Beamforming and 5G antennas•Millimeter-wave and terahertz antennas•Flexible, wearable, thin film, origami, dielectric, and on-chip antennas•MIMO antennas and phased arrays•Direction-finding and GPS antennas•Active antennas•Low-profile wideband antennas•Nanoantennas•Reflectors and other satellite and radio-telescope antennas•Low-frequency, HF, VHF, UHF, ECM, and ESM antennas•Impedance-matching techniques and material characteristics•Metastructured and frequency selective surfaces•Propagation and guided structures•Computational techniques and toolsets•Indoor and outdoor measurements

Electronics World

This book addresses propagation phenomena in satellite, radar, broadcasting, short range , trans-horizon and several recent modes of communications in radio links. Also, it includes some topics on antennas , radio noises and improvement techniques. The book provides the necessary basic matters, as well as experimental results and calculation procedures for radio link design.

RF Engineering for Wireless Networks

The demand for wireless access to network services is growing in virtually all communications and computing applications. Once accustomed to unteathered operation, users resent being tied to a desk or a fixed location, but will endure it when there is some substantial benefit, such as higher resolution or bandwidth. Recent technological advances, however, such as the scaling of VLSI, the development of low-power circuit design techniques and architectures, increasing battery energy capacity, and advanced displays, are rapidly improving the capabilities of wireless devices. Many of the technological advances contributing to this revolution pertain to the wireless medium itself. There are two viable media: radio and optical. In radio, spread-spectrum techniques allow different users and services to coexist in the same bandwidth, and new microwave frequencies with plentiful bandwidth become viable as the speed of the supporting low-cost electronics increases. Radio has the advantage of being available ubiquitously indoors and outdoors, with the possibility of a seam less system infrastructure that allows users to move between the two. There are unan swered (but likely to be benign) biological effects of microwave radiation at higher power densities. Optical communications is enhanced by advances in photonic devices, such as semiconductor lasers and detectors. Optical is primarily an indoor technology - where it need not compete with sunlight - and offers advantages such as the immediate availability of a broad bandwidth without the need for regulatory approval.

Modern Lens Antennas for Communications Engineering

Antennas

Wireless Networking in the Developing World

Emerging Technologies in Data Mining and Information Security

Fixed broadband networks can provide far higher data rates and capacity than the currently envisioned 3G and 4G mobile cellular systems. Achieving higher data rates is due to the unique technical properties of fixed systems, in particular, the use of high gain and adaptive antennas, wide frequency bands, dynamic data rate and channel resource allocation, and advanced multiple access techniques. Fixed Broadband Wireless System Design is a comprehensive presentation of the engineering principles, advanced engineering techniques, and practical design methods for planning and deploying fixed wireless systems, including: Point-to-point LOS and NLOS network design Point-to-point microwave link design including active and passive repeaters Consecutive point and mesh network planning Advanced empirical and physical propagation modeling including ray-tracing Detailed microwave fading models for multipath and rain NLOS (indoor and outdoor) propagation and fading models Propagation environment models including terrain, morphology, buildings, and atmospheric effects Novel mixed application packet traffic modeling for dimensioning network capacity Narrow beam, wide beam, and adaptive (smart) antennas MIMO systems and space-time coding Channel planning including fixed and dynamic channel assignment and dynamic packet assignment IEEE 802.11b and 802.11a (WLAN) system design Free space optic (FSO) link design At present, there are no titles available that provide such a concise presentation of the wide variety of systems, frequency bands, multiple access techniques, and other factors that distinguish fixed wireless systems from mobile wireless systems. Fixed Broadband Wireless System Design is essential reading for design, system and RF engineers involved in the design and deployment of fixed broadband wireless systems, fixed wireless equipment vendors, and academics and postgraduate students in the field.

Business Data Communications and Networking

This SpringerBrief explores features of digital protocol wireless communications systems, and features of the emerging electrical smart grid. Both low power and high power wireless systems are described. The work also examines the cybersecurity vulnerabilities, threats and current levels of risks to critical infrastructures that rely on digital wireless technologies. Specific topics include areas of application for high criticality wireless networks (HCWN), modeling risks and vulnerabilities, governance and management frameworks, systemic mitigation, reliable operation, assessing effectiveness and efficiency, resilience testing, and accountability of HCWN. Designed for researchers and professionals, this SpringerBrief provides essential information for avoiding malevolent uses of wireless networks. The content is also valuable for advanced-level students interested in security studies or wireless networks.

Fixed Broadband Wireless System Design

"Professor Andreas F. Molisch, renowned researcher and educator, has put together the comprehensive book, Wireless Communications. The second edition,

which includes a wealth of new material on important topics, ensures the role of the text as the key resource for every student, researcher, and practitioner in the field." —Professor Moe Win, MIT, USA Wireless communications has grown rapidly over the past decade from a niche market into one of the most important, fast moving industries. Fully updated to incorporate the latest research and developments, *Wireless Communications, Second Edition* provides an authoritative overview of the principles and applications of mobile communication technology. The author provides an in-depth analysis of current treatment of the area, addressing both the traditional elements, such as Rayleigh fading, BER in flat fading channels, and equalisation, and more recently emerging topics such as multi-user detection in CDMA systems, MIMO systems, and cognitive radio. The dominant wireless standards; including cellular, cordless and wireless LANs; are discussed. Topics featured include: wireless propagation channels, transceivers and signal processing, multiple access and advanced transceiver schemes, and standardised wireless systems. Combines mathematical descriptions with intuitive explanations of the physical facts, enabling readers to acquire a deep understanding of the subject. Includes new chapters on cognitive radio, cooperative communications and relaying, video coding, 3GPP Long Term Evolution, and WiMax; plus significant new sections on multi-user MIMO, 802.11n, and information theory. Companion website featuring: supplementary material on 'DECT', solutions manual and presentation slides for instructors, appendices, list of abbreviations and other useful resources.

Wireless Hacks

This book details Practical Solar Energy Harvesting, Automatic Solar-Tracking, Sun-Tracking-Systems, Solar-Trackers and Sun Tracker Systems using motorized automatic positioning concepts and control principles. An intelligent automatic solar tracker is a device that orients a payload toward the sun. Such programmable computer based solar tracking device includes principles of solar tracking, solar tracking systems, as well as microcontroller, microprocessor and/or PC based solar tracking control to orientate solar reflectors, solar lenses, photovoltaic panels or other optical configurations towards the sun. Motorized space frames and kinematic systems ensure motion dynamics and employ drive technology and gearing principles to steer optical configurations such as mangin, parabolic, conic, or cassegrain solar energy collectors to face the sun and follow the sun movement contour continuously. In general, the book may benefit solar research and solar energy applications in countries such as Africa, Mediterranean, Italy, Spain, Greece, USA, Mexico, South America, Brazilia, Argentina, Chili, India, Malaysia, Middle East, UAE, Russia, Japan and China. This book on practical automatic Solar-Tracking Sun-Tracking is in .PDF format and can easily be converted to the .EPUB .MOBI .AZW .ePub .FB2 .LIT .LRF .MOBI .PDB .PDF .TCR formats for smartphones and Kindle by using the ebook.online-convert.com facility. The content of the book is also applicable to communication antenna satellite tracking and moon tracking algorithm source code for which links to free download links are provided. In harnessing power from the sun through a solar tracker or practical solar tracking system, renewable energy control automation systems require automatic solar tracking software and solar position algorithms to accomplish dynamic motion control with control automation architecture, circuit boards and hardware. On-axis sun tracking system such as the altitude-azimuth dual axis or multi-axis solar

tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun's passage through the sky is traced with high precision in automated solar tracker applications, right through summer solstice, solar equinox and winter solstice. A high precision sun position calculator or sun position algorithm is this an important step in the design and construction of an automatic solar tracking system. From sun tracing software perspective, the sonnet Tracing The Sun has a literal meaning. Within the context of sun track and trace, this book explains that the sun's daily path across the sky is directed by relatively simple principles, and if grasped/understood, then it is relatively easy to trace the sun with sun following software. Sun position computer software for tracing the sun are available as open source code, sources that is listed in this book. Ironically there was even a system called sun chaser, said to have been a solar positioner system known for chasing the sun throughout the day. Using solar equations in an electronic circuit for automatic solar tracking is quite simple, even if you are a novice, but mathematical solar equations are over complicated by academic experts and professors in text-books, journal articles and internet websites. In terms of solar hobbies, scholars, students and Hobbyist's looking at solar tracking electronics or PC programs for solar tracking are usually overcome by the sheer volume of scientific material and internet resources, which leaves many developers in frustration when search for simple experimental solar tracking source-code for their on-axis sun-tracking systems. This booklet will simplify the search for the mystical sun tracking formulas for your sun tracker innovation and help you develop your own autonomous solar tracking controller. By directing the solar collector directly into the sun, a solar harvesting means or device can harness sunlight or thermal heat. This is achieved with the help of sun angle formulas, solar angle formulas or solar tracking procedures for the calculation of sun's position in the sky. Automatic sun tracking system software includes algorithms for solar altitude azimuth angle calculations required in following the sun across the sky. In using the longitude, latitude GPS coordinates of the solar tracker location, these sun tracking software tools supports precision solar tracking by determining the solar altitude-azimuth coordinates for the sun trajectory in altitude-azimuth tracking at the tracker location, using certain sun angle formulas in sun vector calculations. Instead of follow the sun software, a sun tracking sensor such as a sun sensor or webcam or video camera with vision based sun following image processing software can also be used to determine the position of the sun optically. Such optical feedback devices are often used in solar panel tracking systems and dish tracking systems. Dynamic sun tracing is also used in solar surveying, DNI analyser and sun surveying systems that build solar infographics maps with solar radiance, irradiance and DNI models for GIS (geographical information system). In this way geospatial methods on solar/environment interaction makes use use of geospatial technologies (GIS, Remote Sensing, and Cartography). Climatic data and weather station or weather center data, as well as queries from sky servers and solar resource database systems (i.e. on DB2, Sybase, Oracle, SQL, MySQL) may also be associated with solar GIS maps. In such solar resource modelling systems, a pyranometer or solarimeter is normally used in addition to measure direct and indirect, scattered, dispersed, reflective radiation for a particular geographical location. Sunlight analysis is important in flash photography where photographic lighting are important for photographers. GIS systems are used by architects who add sun shadow applets to study architectural shading or sun shadow analysis, solar flux calculations, optical modelling or to

perform weather modelling. Such systems often employ a computer operated telescope type mechanism with ray tracing program software as a solar navigator or sun tracer that determines the solar position and intensity. The purpose of this booklet is to assist developers to track and trace suitable source-code and solar tracking algorithms for their application, whether a hobbyist, scientist, technician or engineer. Many open-source sun following and tracking algorithms and source-code for solar tracking programs and modules are freely available to download on the internet today. Certain proprietary solar tracker kits and solar tracking controllers include a software development kit SDK for its application programming interface API attributes (Pebble). Widget libraries, widget toolkits, GUI toolkit and UX libraries with graphical control elements are also available to construct the graphical user interface (GUI) for your solar tracking or solar power monitoring program. The solar library used by solar position calculators, solar simulation software and solar contour calculators include machine program code for the solar hardware controller which are software programmed into Micro-controllers, Programmable Logic Controllers PLC, programmable gate arrays, Arduino processor or PIC processor. PC based solar tracking is also high in demand using C++, Visual Basic VB, as well as MS Windows, Linux and Apple Mac based operating systems for sun path tables on Matlab, Excel. Some books and internet webpages use other terms, such as: sun angle calculator, sun position calculator or solar angle calculator. As said, such software code calculate the solar azimuth angle, solar altitude angle, solar elevation angle or the solar Zenith angle (Zenith solar angle is simply referenced from vertical plane, the mirror of the elevation angle measured from the horizontal or ground plane level). Similar software code is also used in solar calculator apps or the solar power calculator apps for IOS and Android smartphone devices. Most of these smartphone solar mobile apps show the sun path and sun-angles for any location and date over a 24 hour period. Some smartphones include augmented reality features in which you can physically see and look at the solar path through your cell phone camera or mobile phone camera at your phone's specific GPS location. In the computer programming and digital signal processing (DSP) environment, (free/open source) program code are available for VB, .Net, Delphi, Python, C, C+, C++, PHP, Swift, ADM, F, Flash, Basic, QBasic, GBasic, KBasic, SIMPL language, Squirrel, Solaris, Assembly language on operating systems such as MS Windows, Apple Mac, DOS or Linux OS. Software algorithms predicting position of the sun in the sky are commonly available as graphical programming platforms such as Matlab (Mathworks), Simulink models, Java applets, TRNSYS simulations, Scada system apps, Labview module, Beckhoff TwinCAT (Visual Studio), Siemens SPA, mobile and iphone apps, Android or iOS tablet apps, and so forth. At the same time, PLC software code for a range of sun tracking automation technology can follow the profile of sun in sky for Siemens, HP, Panasonic, ABB, Allan Bradley, OMRON, SEW, Festo, Beckhoff, Rockwell, Schneider, Endress Hauser, Fudji electric. Honeywell, Fuchs, Yokonawa, or Muthibishi platforms. Sun path projection software are also available for a range of modular IPC embedded PC motherboards, Industrial PC, PLC (Programmable Logic Controller) and PAC (Programmable Automation Controller) such as the Siemens S7-1200 or Siemens Logo, Beckhoff IPC or CX series, OMRON PLC, Ercam PLC, AC500plc ABB, National Instruments NI PXI or NI cRIO, PIC processor, Intel 8051/8085, IBM (Cell, Power, Brain or Truenorth series), FPGA (Xilinx Altera Nios), Intel, Xeon, Atmel megaAVR, MPU, Maple, Teensy, MSP, XMOS, Xbee, ARM, Raspberry Pi, Eagle, Arduino or Arduino AtMega microcontroller, with servo motor,

stepper motor, direct current DC pulse width modulation PWM (current driver) or alternating current AC SPS or IPC variable frequency drives VFD motor drives (also termed adjustable-frequency drive, variable-speed drive, AC drive, micro drive or inverter drive) for electrical, mechatronic, pneumatic, or hydraulic solar tracking actuators. The above motion control and robot control systems include analogue or digital interfacing ports on the processors to allow for tracker angle orientation feedback control through one or a combination of angle sensor or angle encoder, shaft encoder, precision encoder, optical encoder, magnetic encoder, direction encoder, rotational encoder, chip encoder, tilt sensor, inclination sensor, or pitch sensor. Note that the tracker's elevation or zenith axis angle may be measured using an altitude angle-, declination angle-, inclination angle-, pitch angle-, or vertical angle-, zenith angle- sensor or inclinometer. Similarly the tracker's azimuth axis angle may be measured with an azimuth angle-, horizontal angle-, or roll angle- sensor. Chip integrated accelerometer magnetometer gyroscope type angle sensors can also be used to calculate displacement. Other options include the use of thermal imaging systems such as a Fluke thermal imager, or robotic or vision based solar tracker systems that employ face tracking, head tracking, hand tracking, eye tracking and car tracking principles in solar tracking. With unattended decentralised rural, island, isolated, or autonomous off-grid power installations, remote control, monitoring, data acquisition, digital datalogging and online measurement and verification equipment becomes crucial. It assists the operator with supervisory control to monitor the efficiency of remote renewable energy resources and systems and provide valuable web-based feedback in terms of CO₂ and clean development mechanism (CDM) reporting. A power quality analyser for diagnostics through internet, WiFi and cellular mobile links is most valuable in frontline troubleshooting and predictive maintenance, where quick diagnostic analysis is required to detect and prevent power quality issues. Solar tracker applications cover a wide spectrum of solar applications and solar assisted application, including concentrated solar power generation, solar desalination, solar water purification, solar steam generation, solar electricity generation, solar industrial process heat, solar thermal heat storage, solar food dryers, solar water pumping, hydrogen production from methane or producing hydrogen and oxygen from water (HHO) through electrolysis. Many patented or non-patented solar apparatus include tracking in solar apparatus for solar electric generator, solar desalinators, solar steam engine, solar ice maker, solar water purifier, solar cooling, solar refrigeration, USB solar charger, solar phone charging, portable solar charging tracker, solar coffee brewing, solar cooking or solar drying means. Your project may be the next breakthrough or patent, but your invention is held back by frustration in search for the sun tracker you require for your solar powered appliance, solar generator, solar tracker robot, solar freezer, solar cooker, solar drier, solar pump, solar freezer, or solar dryer project. Whether your solar electronic circuit diagram includes a simplified solar controller design in a solar electricity project, solar power kit, solar hobby kit, solar steam generator, solar hot water system, solar ice maker, solar desalinators, hobbyist solar panels, hobby robot, or if you are developing professional or hobby electronics for a solar utility or micro scale solar powerplant for your own solar farm or solar farming, this publication may help accelerate the development of your solar tracking innovation. Lately, solar polygeneration, solar trigeneration (solar triple generation), and solar quad generation (adding delivery of steam, liquid/gaseous fuel, or capture food-grade CO₂) systems have need for automatic solar tracking. These systems are

known for significant efficiency increases in energy yield as a result of the integration and re-use of waste or residual heat and are suitable for compact packaged micro solar powerplants that could be manufactured and transported in kit-form and operate on a plug-and play basis. Typical hybrid solar power systems include compact or packaged solar micro combined heat and power (CHP or mCHP) or solar micro combined, cooling, heating and power (CCHP, CHPC, mCCHP, or mCHPC) systems used in distributed power generation. These systems are often combined in concentrated solar CSP and CPV smart microgrid configurations for off-grid rural, island or isolated microgrid, minigrid and distributed power renewable energy systems. Solar tracking algorithms are also used in modelling of trigeneration systems using Matlab Simulink (Modelica or TRNSYS) platform as well as in automation and control of renewable energy systems through intelligent parsing, multi-objective, adaptive learning control and control optimization strategies. Solar tracking algorithms also find application in developing solar models for country or location specific solar studies, for example in terms of measuring or analysis of the fluctuations of the solar radiation (i.e. direct and diffuse radiation) in a particular area. Solar DNI, solar irradiance and atmospheric information and models can thus be integrated into a solar map, solar atlas or geographical information systems (GIS). Such models allows for defining local parameters for specific regions that may be valuable in terms of the evaluation of different solar in photovoltaic or CSP systems on simulation and synthesis platforms such as Matlab and Simulink or in linear or multi-objective optimization algorithm platforms such as COMPOSE, EnergyPLAN or DER-CAM. A dual-axis solar tracker and single-axis solar tracker may use a sun tracker program or sun tracker algorithm to position a solar dish, solar panel array, heliostat array, PV panel, solar antenna or infrared solar nantenna. A self-tracking solar concentrator performs automatic solar tracking by computing the solar vector. Solar position algorithms (TwinCAT, SPA, or PSA Algorithms) use an astronomical algorithm to calculate the position of the sun. It uses astronomical software algorithms and equations for solar tracking in the calculation of sun's position in the sky for each location on the earth at any time of day. Like an optical solar telescope, the solar position algorithm pin-points the solar reflector at the sun and locks onto the sun's position to track the sun across the sky as the sun progresses throughout the day. Optical sensors such as photodiodes, light-dependant-resistors (LDR) or photoresistors are used as optical accuracy feedback devices. Lately we also included a section in the book (with links to microprocessor code) on how the PixArt Wii infrared camera in the Wii remote or Wiimote may be used in infrared solar tracking applications. In order to harvest free energy from the sun, some automatic solar positioning systems use an optical means to direct the solar tracking device. These solar tracking strategies use optical tracking techniques, such as a sun sensor means, to direct sun rays onto a silicon or CMOS substrate to determine the X and Y coordinates of the sun's position. In a solar mems sun-sensor device, incident sunlight enters the sun sensor through a small pin-hole in a mask plate where light is exposed to a silicon substrate. In a web-camera or camera image processing sun tracking and sun following means, object tracking software performs multi object tracking or moving object tracking methods. In an solar object tracking technique, image processing software performs mathematical processing to box the outline of the apparent solar disc or sun blob within the captured image frame, while sun-localization is performed with an edge detection algorithm to determine the solar vector coordinates. An automated positioning system help maximize the yields of

solar power plants through solar tracking control to harness sun's energy. In such renewable energy systems, the solar panel positioning system uses a sun tracking techniques and a solar angle calculator in positioning PV panels in photovoltaic systems and concentrated photovoltaic CPV systems. Automatic on-axis solar tracking in a PV solar tracking system can be dual-axis sun tracking or single-axis sun solar tracking. It is known that a motorized positioning system in a photovoltaic panel tracker increase energy yield and ensures increased power output, even in a single axis solar tracking configuration. Other applications such as robotic solar tracker or robotic solar tracking system uses robotica with artificial intelligence in the control optimization of energy yield in solar harvesting through a robotic tracking system. Automatic positioning systems in solar tracking designs are also used in other free energy generators, such as concentrated solar thermal power CSP and dish Stirling systems. The sun tracking device in a solar collector in a solar concentrator or solar collector Such a performs on-axis solar tracking, a dual axis solar tracker assists to harness energy from the sun through an optical solar collector, which can be a parabolic mirror, parabolic reflector, Fresnel lens or mirror array/matrix. A parabolic dish or reflector is dynamically steered using a transmission system or solar tracking slew drive mean. In steering the dish to face the sun, the power dish actuator and actuation means in a parabolic dish system optically focusses the sun's energy on the focal point of a parabolic dish or solar concentrating means. A Stirling engine, solar heat pipe, thermosyphin, solar phase change material PCM receiver, or a fibre optic sunlight receiver means is located at the focal point of the solar concentrator. The dish Stirling engine configuration is referred to as a dish Stirling system or Stirling power generation system. Hybrid solar power systems (used in combination with biogas, biofuel, petrol, ethanol, diesel, natural gas or PNG) use a combination of power sources to harness and store solar energy in a storage medium. Any multitude of energy sources can be combined through the use of controllers and the energy stored in batteries, phase change material, thermal heat storage, and in cogeneration form converted to the required power using thermodynamic cycles (organic Rankin, Brayton cycle, micro turbine, Stirling) with an inverter and charge controller. В этой книге подробно Автоматическая Solar-Tracking, BC-Tracking-Systems, Solar-трекеры и BC Tracker Systems. Интеллектуальный автоматический солнечной слежения является устройством, которое ориентирует полезную нагрузку к солнцу. Такое программируемый компьютер на основе солнечной устройство слежения включает принципы солнечной слежения, солнечных систем слежения, а также микроконтроллер, микропроцессор и / или ПК на базе управления солнечной отслеживания ориентироваться солнечных отражателей, солнечные линзы, фотоэлектрические панели или другие оптические конфигурации к BC Моторизованные космические кадры и кинематические системы обеспечения динамики движения и использовать приводной техники и готовится принципы, чтобы направить оптические конфигурации, такие как Манжен, параболических, конических или Кассегрена солнечных коллекторов энергии, чтобы лицом к солнцу и следовать за солнцем контур движения непрерывно. В обуздывать силу от солнца через солнечный трекер или практической солнечной системы слежения, системы возобновляемых контроля энергии автоматизации требуют автоматического солнечной отслеживания программного обеспечения и алгоритмов солнечные позиции для достижения динамического контроля движения с архитектуры автоматизации

low noise temperature. Their structures can be more compact and weigh less than horn antennas and parabolic antennas. Lens antennas with their quasi-optical characteristics, also have low loss, particularly at near millimeter and submillimeter wavelengths where they have particular advantages. This book systematically conducts advanced and up-to-date treatment of lens antennas.

Jane's International Defense Review

Free to download eBook on Practical Solar Tracking Design, Solar Tracking, Sun Tracking, Sun Tracker, Solar Tracker, Follow Sun, Sun Position calculation (Azimuth, Elevation, Zenith), Sun following, Sunrise, Sunset, Moon-phase, Moonrise, Moonset calculators. In harnessing power from the sun through a solar tracker or solar tracking system, renewable energy system developers require automatic solar tracking software and solar position algorithms. On-axis sun tracking system such as the altitude-azimuth dual axis or multi-axis solar tracker systems use a sun tracking algorithm or ray tracing sensors or software to ensure the sun's passage through the sky is traced with high precision in automated solar tracker applications, right through summer solstice, solar equinox and winter solstice. Eco Friendly and Environmentally Sustainable Micro Combined Solar Heat and Power (m-CHP, m-CCHP, m-CHCP) with Microgrid Storage and Layered Smartgrid Control towards Supplying Off-Grid Rural Villages in developing BRICS countries such as Africa, India, China and Brazil. Off-grid rural villages and isolated islands areas require mCHP and trigeneration solar power plants and associated isolated smart microgrid solutions to serve the community energy needs. This article describes the development progress for such a system, also referred to as solar polygeneration. The system includes a sun tracker mechanism wherein a parabolic dish or lenses are guided by a light sensitive mechanism in a way that the solar receiver is always at right angle to the solar radiation. Solar thermal energy is then either converted into electrical energy through a free piston Stirling, or stored in a thermal storage container. The project includes the thermodynamic modeling of the plant in Matlab Simulink as well as the development of an intelligent control approach that includes smart microgrid distribution and optimization. The book includes aspects in the simulation and optimization of stand-alone hybrid renewable energy systems and co-generation in isolated or islanded microgrids. It focusses on the stepwise development of a hybrid solar driven micro combined cooling heating and power (mCCHP) compact trigeneration polygeneration and thermal energy storage (TES) system with intelligent weather prediction, weak-ahead scheduling (time horizon), and look-ahead dispatch on integrated smart microgrid distribution principles. The solar harvesting and solar thermodynamic system includes an automatic sun tracking platform based on a PLC controlled mechatronic sun tracking system that follows the sun progressing across the sky. An intelligent energy management and adaptive learning control optimization approach is proposed for autonomous off-grid remote power applications, both for thermodynamic optimization and smart micro-grid optimization for distributed energy resources (DER). The correct resolution of this load-following multi objective optimization problem is a complex task because of the high number and multi-dimensional variables, the cross-correlation and interdependency between the energy streams as well as the non-linearity in the performance of some of the system components. Exergy-based control approaches for smartgrid topologies are considered in terms of the intelligence behind the safe and reliable operation of a

microgrid in an automated system that can manage energy flow in electrical as well as thermal energy systems. The standalone micro-grid solution would be suitable for a rural village, intelligent building, district energy system, campus power, shopping mall centre, isolated network, eco estate or remote island application setting where self-generation and decentralized energy system concepts play a role. Discrete digital simulation models for the thermodynamic and active demand side management systems with digital smartgrid control unit to optimize the system energy management is currently under development. Parametric simulation models for this trigeneration system (polygeneration, poligeneration, quadgeneration) are developed on the Matlab Simulink and TrnSys platforms. In terms of model predictive coding strategies, the automation controller will perform multi-objective cost optimization for energy management on a microgrid level by managing the generation and storage of electrical, heat and cooling energies in layers. Each layer has its own set of smart microgrid priorities associated with user demand side cycle predictions. Mixed Integer Linear Programming and Neural network algorithms are being modeled to perform Multi Objective Control optimization as potential optimization and adaptive learning techniques.

2018 International Conference on Current Trends Towards Converging Technologies (ICCTCT)

Provides instructions for fifteen projects using wireless technology, including a wi-fi antenna cable, a solar-powered wireless repeater, and a car-to-car wireless video link.

Microwave Horns and Feeds

Finally, here is a single volume containing all of the engineering information needed to successfully design and implement any type of wireless network! Author Dan Dobkin covers every aspect of RF engineering necessary for wireless networks. He begins with a review of essential math and electromagnetic theory followed by thorough discussions of multiplexing, modulation types, bandwidth, link budgets, network concepts, radio system architectures, RF amplifiers, mixers and frequency conversion, filters, single-chip radio systems, antenna theory and designs, signal propagation, as well as planning and implementing wireless networks for both indoor and outdoor environments. The appendices contain such vital data as U.S., European, and Japanese technical and regulatory standards for wireless networks, measurements in wireless networks, reflection and matching of transmission lines, determining power density, and much more. No matter what type of wireless network you design—Bluetooth, UWB, or even metropolitan area network (MAN)—this book is the one reference you can't do without! The A-to-Z guide to wireless network engineering—covers everything from basic electromagnetic theory to modulation techniques to network planning and implementation! Engineering and design principles covered are applicable to any type of wireless network, including 802.11, 802.16, 802.20, and Bluetooth. Discusses state-of-the-art modulation techniques such as ultra wideband (UWB) and orthogonal frequency-division multiplexing (OFDM).

High Energy Laser (Hel)

As the world grows increasingly interconnected, data communications has become a critical aspect of business operations. Wireless and mobile technology allows us to seamlessly transition from work to play and back again, and the Internet of things has brought our appliances, vehicles, and homes into the network; as life increasingly takes place online, businesses recognize the opportunity for a competitive advantage. Today's networking professionals have become central to nearly every aspect of business, and this book provides the essential foundation needed to build and manage the scalable, mobile, secure networks these businesses require. Although the technologies evolve rapidly, the underlying concepts are more constant. This book combines the foundational concepts with practical exercises to provide a well-grounded approach to networking in business today. Key management and technical issues are highlighted and discussed in the context of real-world applications, and hands-on exercises reinforce critical concepts while providing insight into day-to-day operations. Detailed technical descriptions reveal the tradeoffs not presented in product summaries, building the analytical capacity needed to understand, evaluate, and compare current and future technologies.

Optical Wireless Communications

An introduction to RF propagation that spans all wireless applications This book provides readers with a solid understanding of the concepts involved in the propagation of electromagnetic waves and of the commonly used modeling techniques. While many books cover RF propagation, most are geared to cellular telephone systems and, therefore, are limited in scope. This title is comprehensive—it treats the growing number of wireless applications that range well beyond the mobile telecommunications industry, including radar and satellite communications. The author's straightforward, clear style makes it easy for readers to gain the necessary background in electromagnetics, communication theory, and probability, so they can advance to propagation models for near-earth, indoor, and earth-space propagation. Critical topics that readers would otherwise have to search a number of resources to find are included: * RF safety chapter provides a concise presentation of FCC recommendations, including application examples, and prepares readers to work with real-world propagating systems * Antenna chapter provides an introduction to a wide variety of antennas and techniques for antenna analysis, including a detailed treatment of antenna polarization and axial ratio; the chapter contains a set of curves that permit readers to estimate polarization loss due to axial ratio mismatch between transmitting and receiving antennas without performing detailed calculations * Atmospheric effects chapter provides curves of typical atmospheric loss, so that expected loss can be determined easily * Rain attenuation chapter features a summary of how to apply the ITU and Crane rain models * Satellite communication chapter provides the details of earth-space propagation analysis including rain attenuation, atmospheric absorption, path length determination and noise temperature determination Examples of widely used models provide all the details and information needed to allow readers to apply the models with confidence. References, provided throughout the book, enable readers to explore particular topics in greater depth. Additionally, an accompanying Wiley ftp site provides supporting MathCad files for select figures in

the book. With its emphasis on fundamentals, detailed examples, and comprehensive coverage of models and applications, this is an excellent text for upper-level undergraduate or graduate students, or for the practicing engineer who needs to develop an understanding of propagation phenomena.

Deploying License-free Wireless Wide-area Networks

The second edition of *Electronic Imaging in Astronomy: Detectors and Instrumentation* describes the remarkable developments that have taken place in astronomical detectors and instrumentation in recent years - from the invention of the charge-coupled device (CCD) in 1970 to the current era of very large telescopes, such as the Keck 10-meter telescopes in Hawaii with their laser guide-star adaptive optics which rival the image quality of the Hubble Space Telescope. Authored by one of the world's foremost experts on the design and development of electronic imaging systems for astronomy, this book has been written on several levels to appeal to a broad readership. Mathematical expositions are designed to encourage a wider audience, especially among the growing community of amateur astronomers with small telescopes with CCD cameras. The book can be used at the college level for an introductory course on modern astronomical detectors and instruments, and as a supplement for a practical or laboratory class.

ICESC 2019

Handbook of Reflector Antennas and Feed Systems Volume III: Applications of Reflectors

The authors bring readers more of the practical tips and tricks that made the first edition a runaway hit. Completely revised and updated, this version includes over 30 new hacks, major overhauls of over 30 more, and timely adjustments and touch-ups to dozens of other hacks.

Wireless Networking Technology

Best practices for planning and deployment of broadband WWANs Learn insider tips from an experienced wireless industry leader Understand the principles that underlie the operation of all wireless systems Learn how to provide profitable and reliable wireless Internet access Select the most effective equipment and antenna systems for your area Avoid common pitfalls encountered by new wireless network operators Minimize the effects of noise and interference on your network Enjoy the satisfaction of providing wireless Internet access to your community Practice the business principles used by successful wireless ISPs (WISPs) Use 802.11a, 802.11b, and 802.11g equipment more successfully in your own home, office, or outdoor environment Choose the right network architecture for your wireless network Conduct physical site surveys and radio-frequency (RF) site surveys License-free broadband wireless wide-area networks (WWANs) provide fast deployment of low-cost, high-speed "last-mile" wireless Internet access. License-free wireless technology delivers these benefits without requiring the use of products or services provided by local telephone or cable companies. WWANs enable Internet service

providers (ISPs) and corporate IT managers to deploy their own cost-efficient broadband networks that deliver high-speed access for buildings and areas where traditional wired connectivity is either completely unavailable or is cost-prohibitive. Deploying License-Free Wireless Wide-Area Networks is the first book that provides complete, real-world "start-to-finish" design, installation, operation, and support information for wireless ISPs and other organizations deploying outdoor wireless WANs-including coverage of 802.11a, 802.11b, 802.11g, and proprietary-protocol networks. This vendor-neutral book covers all brands of broadband wireless equipment and explains the principles upon which all wireless equipment is based. Inside, you'll find step-by-step instructions and crystal-clear explanations that walk you through initial planning stages and onto full wireless network operation. End-of-chapter review questions reinforce important concepts. Whether you're an IT director, ISP engineer, network architect, or field technician, Deploying License-Free Wireless Wide-Area Networks is your essential reference. With practical, in-depth coverage of the real-world challenges of outdoor, license-free wireless WAN deployment, this book provides a comprehensive, vendor-neutral guide to successful wireless network design and

Hands-on Math

As the demand for higher bandwidth has led to the development of increasingly complex wireless technologies, an understanding of both wireless networking technologies and radio frequency (RF) principles is essential for implementing high performance and cost effective wireless networks. Wireless Networking Technology clearly explains the latest wireless technologies, covering all scales of wireless networking from personal (PAN) through local area (LAN) to metropolitan (MAN). Building on a comprehensive review of the underlying technologies, this practical guide contains 'how to' implementation information, including a case study that looks at the specific requirements for a voice over wireless LAN application. This invaluable resource will give engineers and managers all the necessary knowledge to design, implement and operate high performance wireless networks. · Explore in detail wireless networking technologies and understand the concepts behind RF propagation. · Gain the knowledge and skills required to install, use and troubleshoot wireless networks. · Learn how to address the problems involved in implementing a wireless network, including the impact of signal propagation on operating range, equipment inter-operability problems and many more. · Maximise the efficiency and security of your wireless network.

History of Wireless

Information Security of Highly Critical Wireless Networks

Stutzman's 3rd edition of Antenna Theory and Design provides a more pedagogical approach with a greater emphasis on computational methods. New features include additional modern material to make the text more exciting and relevant to practicing engineers; new chapters on systems, low-profile elements and base station antennas; organizational changes to improve understanding; more details to selected important topics such as microstrip antennas and arrays; and

expanded measurements topic.

Introduction to Radar Systems

This is the first truly comprehensive and most up-to-date handbook available on modern reflector antennas and feed sources for diversified space and ground applications. There has never been such an all-encompassing reflector handbook in print, and no currently available title offers coverage of such recent research developments. The Handbook consists of three volumes. Volume III focuses on the range of reflector antenna applications, including space, terrestrial, and radar. The intent of this book volume is to provide practical applications and design information on reflector antennas used for several communications systems. This book covers recent developments of reflector antennas used for satellite communications, terrestrial communications, and remote sensing applications. New subjects are introduced for the first time, including satellite antennas, Terahertz antennas, PIM, multipaction, corona, deployable mesh reflector antennas, and mechanical aspects of reflector antennas. In addition, this book contains a separate topic on integrated feed assembly for reflector antennas covering analysis, design, fabrication, and test.

Practical Solar Tracking Automatic Solar Tracking Sun Tracking Автоматическое удержание Солнечная слежения ВС

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Hands-On Math: Building and Understanding a Parabolic Reflector introduces the reader to conic sections and explains how to build an inexpensive parabolic reflector. Building a parabolic reflector and working through the associated math is a project easily tailored to classrooms from Algebra I through Calculus. Hands-on and enjoyable, this project is ideal for demonstrating the beauty and power of math in every day living. The text includes detailed building plans and step-by-step instructions (accompanied by numerous photographs) for designing and building a parabolic reflector. The mathematics of the parabola are presented including a derivation of the equation of the parabola from its geometric definition and multiple proofs of the reflective property of the parabola. Methods for working with quadratic equations - factoring, completing the square, and graphing - are presented. Multiple problem sets are provided for practice, along with a complete answer key.

Hardware Age

The book comprises selected papers presented at the International Conference on Wireless Communication (ICWiCOM), which is organized by D. J. Sanghvi College of Engineering's Department of Electronics and Telecommunication Engineering. The book focuses on specific topics of wireless communication, like signal and image processing applicable to wireless domains, networking, microwave and antenna design, and telemedicine systems. Covering three main areas - networking, antenna designs and embedded systems applicable to communication - it is a valuable resource for postgraduate and doctoral students.

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