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Applications of Power Electronics

High Performance Control of AC Drives with Matlab®/Simulink Explore this indispensable update to a popular graduate text on electric drive techniques and the latest converters used in industry. The Second Edition of High Performance Control of AC Drives with Matlab®/Simulink delivers an updated and thorough overview of topics central to the understanding of AC motor drive systems. The book includes new material on medium voltage drives, covering state-of-the-art technologies and challenges in the industrial drive system, as well as their components, and control, current source inverter-based drives, PWM techniques for multilevel inverters, and low switching frequency modulation for voltage source inverters. This book covers three-phase and multiphase (more than three-phase) motor drives including their control and practical problems faced in the field (e.g., adding LC filters in the output of a feeding converter), are considered. The new edition contains links to Matlab®/Simulink models and PowerPoint slides ideal for teaching and understanding the material contained within the book. Readers will also benefit from the inclusion of: A thorough introduction to high performance drives, including the challenges and requirements for electric drives and medium voltage industrial applications An exploration of mathematical and simulation models of AC machines, including DC motors and squirrel cage induction motors A treatment of pulse width modulation of power electronic DC-AC converter, including the classification of PWM schemes for voltage source and current source inverters Examinations of harmonic injection PWM and field-oriented control of AC machines Voltage source and current source inverter-fed drives and their control Modelling and control of multiphase motor drive system Supported with a companion website hosting online resources. Perfect for senior undergraduates, MSc and PhD students in power electronics and electric drives, High Performance Control of AC Drives with Matlab®/Simulink will also earn a place in the libraries of researchers working in the field of AC motor drives and power electronics engineers in industry.

United States Court of International Trade Reports

Explaining in detail how new e-mobility technologies work, and the system requirements which must be fulfilled for these new technologies to be implemented, this book augments this analysis with discussion of the business models, financing and social and economic conditions that will foster the emergence of a new e-mobility industry. New e-mobility technologies and business models will initiate changes in work patterns and in our personal choices on transportation means. This book looks at how smart cities may apply the “Internet of things” to the transportation environment and how this may create a complete set of new technologies and service offerings that will enable the advent of the unmanned vehicle society. This e-mobility revolution will disrupt the transport market and bring opportunities and threats for many potential actors. These consequences are analysed within. This book is suitable for anyone interested in the e-mobility revolution and its impact on the future of cars, buses and trains.

Entrepreneurship in Power Semiconductor Devices, Power Electronics, and Electric Machines and Drive Systems

Electrification is an evolving paradigm shift in the transportation industry toward more efficient, higher performance, safer, smarter, and more reliable vehicles. There is in fact a clear trend to move from internal combustion engines (ICEs) to more integrated electrified powertrains. Providing a detailed overview of this growing area, Advanced Electric Drive Vehicles begins with an introduction to the automotive industry, an explanation of the need for electrification, and a presentation of the
fundamentals of conventional vehicles and ICEs. It then proceeds to address the major components of electrified vehicles—i.e.,
power electronic converters, electric machines, electric motor controllers, and energy storage systems. This comprehensive
work: Covers more electric vehicles (MEVs), hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), range-
extended electric vehicles (REEVs), and all-electric vehicles (EVs) including battery electric vehicles (BEVs) and fuel cell
vehicles (FCVs) Describes the electrification technologies applied to nonpropulsion loads, such as power steering and air-
conditioning systems Discusses hybrid battery/ultra-capacitor energy storage systems, as well as 48-V electrification and belt-
driven starter generator systems Considers vehicle-to-grid (V2G) interface and electrical infrastructure issues, energy
management, and optimization in advanced electric drive vehicles Contains numerous illustrations, practical examples, case
studies, and challenging questions and problems throughout to ensure a solid understanding of key concepts and applications

Pittsburgh Business Directory

A sequel to Power Electronics Technology and Applications, this text is targeted specifically towards the needs of practicing
design engineers. The focus is to provide the practicing engineer with up-to-date technology and emerging applications.

Power Devices for Efficient Energy Conversion

This comprehensive handbook provides readers with a single-source reference to the theoretical fundamentals, physical
mechanisms and principles of operation of all known microwave devices and various radars. The author discusses proven
methods of computation and design development, process, schematic, schematic-technical and construction peculiarities of each
breed of the microwave devices, as well as the most popular and original technical solutions for radars. Coverage also includes
the history of creation of the most widely used radars, as well as guidelines for their potential upgrading. Offers readers a
comprehensive, systematized view of all contemporary knowledge, acquired during the last 20 years, on radars and related
disciplines; Provides a single-source reference on the physical mechanisms and principles of operation of the basic components
of radio location devices, including theoretical aspects of designing the necessary, high-efficiency electronic devices and systems,
as well as key, practical methods of computation and design; Presents complex topics using simple language, minimizing
mathematics.

The IGBT Device

Power Electronics and Motor Drives

ISPSD’04

This book covers power electronics, in depth, by presenting the basic principles and application details, which can be used both
as a textbook and reference book. Introduces a new method to present power electronics converters called Power Blocks
Geometry (PBG) Applicable for courses focusing on power electronics, power electronics converters, and advanced power
converters Offers a comprehensive set of simulation results to help understand the circuits presented throughout the book

Advanced Power Electronics Converters

Power Electronics in Renewable Energy Systems and Smart Grid

With this revised edition we aim to present a text on Power Electronics for the UG level which will provide a comprehensive
coverage of converters, choppers, inverters and motor drives. All this, with a rich pedagogy to support the conceptual
understanding and integral use of PSPICE.

Disruptive Wide Bandgap Semiconductors, Related Technologies, and Their Applications

Entrepreneurship in Power Semiconductor Devices, Power Electronics, and Electric Machines and Drive Systems introduces the
basics of entrepreneurship and a methodology for the study of entrepreneurship in electrical engineering and other engineering
fields. Entrepreneurship is considered here in three fields of electrical engineering, viz. power semiconductor devices, power
electronics and electric machines and drive systems, and their current practice. It prepares the reader by providing a review of
the subject matter in the three fields, their current status in research and development with analysis aspect as needed, thus
allowing readers to gain self-sufficiency while reading the book. Each field’s emerging applications, current market and future
market forecasts are introduced to understand the basis and need for emerging startups. Practical learning is introduced in: (i)
power semiconductor devices entrepreneurship through the prism of 20 startups in detail, (ii) power electronics
trepreneurship through 28 startup companies arranged under various application fields and (iii) electric machines and drive
systems entrepreneurship through 15 startups in electromagnetic and 1 in electrostatic machines and drive systems. The book:
(i) demystifies entrepreneurship in a practical way to equip engineers and students with entrepreneurship as an option for their
professional growth, pursuit and success; (ii) provides engineering managers and corporate-level executives a detailed view of entrepreneurship activities in the considered three fields that may potentially impact their businesses, (iii) provides entrepreneurship education in an electrical engineering environment and with direct connection and correlation to their fields of study and (iv) endows a methodology that can be effectively employed not only in the three illustrated fields of electrical engineering but in other fields as well. This book is for electrical engineering students and professionals. For use in undergraduate and graduate courses in electrical engineering, the book contains discussion questions, exercise problems, team and class projects, all from a practical point of view, to train students and assist professionals for future entrepreneurship endeavors.

Grid Converters for Photovoltaic and Wind Power Systems

Maintaining Mission Critical Systems in a 24/7 Environment

An up-to-date, practical guide on upgrading from silicon to GaN, and how to use GaN transistors in power conversion systems design This updated, third edition of a popular book on GaN transistors for efficient power conversion has been substantially expanded to keep students and practicing power conversion engineers ahead of the learning curve in GaN technology advancements. Acknowledging that GaN transistors are not one-to-one replacements for the current MOSFET technology, this book serves as a practical guide for understanding basic GaN transistor construction, characteristics, and applications. Included are discussions on the fundamental physics of these power semiconductors, layout, and other circuit design considerations, as well as specific application examples demonstrating design techniques when employing GaN devices. GaN Transistors for Efficient Power Conversion, 3rd Edition brings key updates to the chapters of Driving GaN Transistors; Modeling, Simulation, and Measurement of GaN Transistors; DC-DC Power Conversion; Envelope Tracking; and Highly Resonant Wireless Energy Transfer. It also offers new chapters on Thermal Management, Multilevel Converters, and Lidar, and revises many others throughout. Written by leaders in the power semiconductor field and industry pioneers in GaN power transistor technology and applications Updated with 35% new material, including three new chapters on Thermal Management, Multilevel Converters, Wireless Power, and Lidar Features practical guidance on formulating specific circuit designs when constructing power conversion systems using GaN transistors A valuable resource for professional engineers, systems designers, and electrical engineering students who need to fully understand the state-of-the-art GaN Transistors for Efficient Power Conversion, 3rd Edition is an essential learning tool and reference guide that enables power conversion engineers to design energy-efficient, smaller, and more cost-effective products using GaN transistors.

Power Electronics Device Applications of Diamond Semiconductors

Vehicular Electric Power Systems

This document brings together a set of latest data points and publicly available information relevant for manufacturing Industry. We are very excited to share this content and believe that readers will benefit from this periodic publication immensely.

Handbook of Microwave and Radar Engineering

Vehicular Electric Power Systems: Land, Sea, Air, and Space Vehicles acquaints professionals with trends and challenges in the development of more electric vehicles (MEVs) using detailed examples and comprehensive discussions of advanced MEV power system architectures, characteristics, and dynamics. The authors focus on real-world applications and highlight issues related to system stability as well as challenges faced during and after implementation. Probes innovations in the development of more electric vehicles for improved maintenance, support, endurance, safety, and cost-efficiency in automotive, aerospace, and marine vehicle engineering Heralding a new wave of advances in power system technology, Vehicular Electric Power Systems discusses: Different automotive power systems including conventional automobiles, more electric cars, heavy-duty vehicles, and electric and hybrid electric vehicles Electric and hybrid electric propulsion systems and control strategies Aerospace power systems including conventional and advanced aircraft, spacecraft, and the international space station Sea and undersea vehicles The modeling, real-time state estimation, and stability assessment of vehicular power systems Applications of fuel cells in various land, sea, air, and space vehicles Modeling techniques for energy storage devices including batteries, fuel cells, photovoltaic cells, and ultracapacitors Advanced power electronic converters and electric motor drives for vehicular applications Guidelines for the proper design of DC and AC distribution architectures

Proceedings of the International Symposium on Power Semiconductor Devices and ICs

Hybrid Power

Power semiconductor devices are widely used for the control and management of electrical energy. The improving performance of power devices has enabled cost reductions and efficiency increases resulting in lower fossil fuel usage and less environmental pollution. This book provides the first cohesive treatment of the physics and design of silicon carbide power devices with an
emphasize on unipolar structures. It uses the results of extensive numerical simulations to elucidate the operating principles of these important devices.

Solar Energy Update

The growth of power electronics, centering on inverters and converters as its key system topology, has accelerated recently due to the demand for efficient power conversion. This growth has also been backed up by several evolutionary changes and breakthroughs achieved in the areas of power semiconductor device physics, process technology, and design. However, as power semiconductor technology remains a highly specialized subject, the literature on further research, development, and design in related fields is not adequate. With this in view, two specialists of power semiconductors, well known for their research and contributions to the field, compiled this book as a review volume focusing on power chip and module technologies. The prime purpose is to help researchers, academia, and engineers, engaged in areas related to power devices and power electronics, better understand the evolutionary growth of major power device components, their operating principles, design aspects, application features, and trends. The book is filled with unique topics related to power semiconductors, including tips on state-of-the-art and futuristic-oriented applications. Numerous diagrams, illustrations, and graphics are included to adequately support the content and make the book extremely attractive as a practical and user-friendly reference book for researchers, technologists, and engineers, as well as a textbook for advanced graduate-level and postgraduate students.

Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, Third Edition

Eighth International Conference on Power Electronics and Variable Speed Drives

The IGBT device has proved to be a highly important Power Semiconductor, providing the basis for adjustable speed motor drives (used in air conditioning and refrigeration and railway locomotives), electronic ignition systems for gasoline-powered motor vehicles and energy-saving compact fluorescent light bulbs. Recent applications include plasma displays (flat-screen TVs) and electric power transmission systems, alternative energy systems and energy storage. This book is the first available to cover the applications of the IGBT, and provide the essential information needed by applications engineers to design new products using the device, in sectors including consumer, industrial, lighting, transportation, medical and renewable energy. The author, B. Jayant Baliga, invented the IGBT in 1980 while working for GE. His book will unlock IGBT for a new generation of engineering applications, making it essential reading for a wide audience of electrical engineers and design engineers, as well as an important publication for semiconductor specialists. Essential design information for applications engineers utilizing IGBTs in the consumer, industrial, lighting, transportation, medical and renewable energy sectors. Readers will learn the methodology for the design of IGBT chips including edge terminations, cell topologies, gate layouts, and integrated current sensors. The first book to cover applications of the IGBT, a device manufactured around the world by more than a dozen companies with sales exceeding $5 Billion; written by the inventor of the device.

Robotic Vehicles: Systems and Technology

Unmanned aerial vehicles (UAVs) are being increasingly used in different applications in both military and civilian domains. These applications include surveillance, reconnaissance, remote sensing, target acquisition, border patrol, infrastructure monitoring, aerial imaging, industrial inspection, and emergency medical aid. Vehicles that can be considered autonomous must be able to make decisions and react to events without direct intervention by humans. Although some UAVs are able to perform increasingly complex autonomous manoeuvres, most UAVs are not fully autonomous; instead, they are mostly operated remotely by humans. To make UAVs fully autonomous, many technological and algorithmic developments are still required. For instance, UAVs will need to improve their sensing of obstacles and subsequent avoidance. This becomes particularly important as autonomous UAVs start to operate in civilian airspaces that are occupied by other aircraft. The aim of this volume is to bring together the work of leading researchers and practitioners in the field of unmanned aerial vehicles with a common interest in their autonomy. The contributions that are part of this volume present key challenges associated with the autonomous control of unmanned aerial vehicles, and propose solution methodologies to address such challenges, analyse the proposed methodologies, and evaluate their performance.

Power Electronic Modules

The growth of power electronics, centering on inverters and converters as its key system topology, has accelerated recently due to the demand for efficient power conversion. This growth has also been backed up by several evolutionary changes and breakthroughs achieved in the areas of power semiconductor device physics, process technology, and design. However, as power semiconductor technology remains a highly specialized subject, the literature on further research, development, and design in related fields is not adequate. With this in view, two specialists of power semiconductors, well known for their research and contributions to the field, compiled this book as a review volume focusing on power chip and module technologies. The prime purpose is to help researchers, academia, and engineers, engaged in areas related to power devices and power electronics, better understand the evolutionary growth of major power device components, their operating principles, design aspects, application features, and trends. The book is filled with unique topics related to power semiconductors, including tips on state-of-the-art and futuristic-oriented applications. Numerous diagrams, illustrations, and graphics are included to adequately support the content and make the book extremely attractive as a practical and user-friendly reference book for researchers, technologists, and engineers, as well as a textbook for advanced graduate-level and postgraduate students.
Advanced Electric Drive Vehicles

Power Devices for Efficient Energy Conversion

Designing and building power semiconductor modules requires a broad, interdisciplinary base of knowledge and experience, ranging from semiconductor materials and technologies, thermal management, and soldering to environmental constraints, inspection techniques, and statistical process control. This diversity poses a significant challenge to engine

I-Bytes Manufacturing Industry

Power Electronic Packaging presents an in-depth overview of power electronic packaging design, assembly, reliability and modeling. Since there is a drastic difference between IC fabrication and power electronic packaging, the book systematically introduces typical power electronic packaging design, assembly, reliability and failure analysis and material selection so readers can clearly understand each task's unique characteristics. Power electronic packaging is one of the fastest growing segments in the power electronic industry, due to the rapid growth of power integrated circuit (IC) fabrication, especially for applications like portable, consumer, home, computing and automotive electronics. This book also covers how advances in both semiconductor content and power advanced package design have helped cause advances in power device capability in recent years. The author extrapolates the most recent trends in the book's areas of focus to highlight where further improvement in materials and techniques can drive continued advancements, particularly in thermal management, usability, efficiency, reliability and overall cost of power semiconductor solutions.

Application Manual Power Semiconductors

SiC and GaN devices have been around for some time. The first dedicated international conference on SiC and related devices, "ICSCRM," was held in Washington, DC, in 1987. But only recently, the commercialization of SiC and GaN devices has happened. Due to its material properties, Si as a semiconductor has limitations in high-temperature, high-voltage, and high-frequency regimes. With the help of SiC and GaN devices, it is possible to realize more efficient power systems. Devices manufactured from SiC and GaN have already been impacting different areas with their ability to outperform Si devices. Some of the examples are the telecommunications, automotive/locomotive, power, and renewable energy industries. To achieve the carbon emission targets set by different countries, it is inevitable to use these new technologies. This book attempts to cover all the important facets related to wide bandgap semiconductor technology, including new challenges posed by it. This book is intended for graduate students, researchers, engineers, and technology experts who have been working in the exciting fields of SiC and GaN power devices.

High Voltage Integrated Circuits

Harris U.S. Manufacturers Directory

This book is an advanced approach to power electronics specifically in terms of renewable energy systems and smart grid. The fourteen chapters are updated and extended versions of the invited papers in the Proc. IEEE special issue of November 2017, contributed by a group of invited authors who are international authorities in their field. The application-oriented chapters are tutorial oriented, with technology status review. The book also includes examples of applications and discussions of future perspectives.

Space Station Systems

The book deals with the fundamentals, theoretical bases, and design methodologies of conventional internal combustion engine (ICE) vehicles, electric vehicles (EVs), hybrid electric vehicles (HEVs), and fuel cell vehicles (FCVs). The design methodology is described in mathematical terms, step-by-step, and the topics are approached from the overall drive train system, not just individual components. Furthermore, in explaining the design methodology of each drive train, design examples are presented with simulation results.

Power Electronics Technology and Applications II

This title constitutes the proceedings of the Eighth International Conference on Power Electronics and Variable Speed Drives. There are 99 papers altogether.

Autonomous Control of Unmanned Aerial Vehicles

Power Electronics and Motor Drives: Advances and Trends, Second Edition is the perfect resource to keep the electrical engineer up-to-speed on the latest advancements in technologies, equipment and applications. Carefully structured to include both traditional topics for entry-level and more advanced applications for the experienced engineer, this reference sheds light on the rapidly growing field of power electronic operations. New content covers converters, machine models and new control
methods such as fuzzy logic and neural network control. This reference will help engineers further understand recent
technologies and gain practical understanding with its inclusion of many industrial applications. Further supported by a
glossary per chapter, this book gives engineers and researchers a critical reference to learn from real-world examples and make
future decisions on power electronic technology and applications. Provides many practical examples of industrial applications
Updates on the newest electronic topics with content added on fuzzy logic and neural networks Presents information from an
expert with decades of research and industrial experience

Power Electronics

Power Electronics Device Applications of Diamond Semiconductors presents state-of-the-art research on diamond growth,
doping, device processing, theoretical modeling and device performance. The book begins with a comprehensive and close
examination of diamond crystal growth from the vapor phase for epitaxial diamond and wafer preparation. It looks at single
crystal vapor deposition (CVD) growth sectors and defect control, ultra high purity SC-CVD, SC diamond wafer CVD,
heteroepitaxy on Ir/MQO and needle-induced large area growth, also discussing the latest doping and semiconductor
characterization methods, fundamental material properties and device physics. The book concludes with a discussion of circuits
and applications, featuring the switching behavior of diamond devices and applications, high frequency and high temperature
operation, and potential applications of diamond semiconductors for high voltage devices. Includes contributions from today’s
most respected researchers who present the latest results for diamond growth, doping, device fabrication, theoretical modeling
and device performance Examines why diamond semiconductors could lead to superior power electronics Discusses the main
challenges to device realization and the best opportunities for the next generation of power electronics

Silicon Carbide Power Devices

Power electronics technology is still an emerging technology, and it has found its way into many applications, from renewable
energy generation (i.e., wind power and solar power) to electrical vehicles (EVs), biomedical devices, and small appliances, such
as laptop chargers. In the near future, electrical energy will be provided and handled by power electronics and consumed
through power electronics; this not only will intensify the role of power electronics technology in power conversion processes,
but also implies that power systems are undergoing a paradigm shift, from centralized distribution to distributed generation.
Today, more than 1000 GW of renewable energy generation sources (photovoltaic (PV) and wind) have been installed, all of
which are handled by power electronics technology. The main aim of this book is to highlight and address recent breakthroughs
in the range of emerging applications in power electronics and in harmonic and electromagnetic interference (EMI) issues at
device and system levels as discussed in robust and reliable power electronics technologies, including fault prognosis and
diagnosis technique stability of grid-connected converters and ?smart control of power electronics in devices, microgrids, and at
system levels.

Power Electronic Packaging


Very Good,No Highlights or Markup,all pages are intact.

Regelverfahren für einen Umrichter zur Symmetrierung einphasiger Lasten in
Drehstromnetzen

This book introduces the technological innovations of robotic vehicles. It presents the concepts required for self-driving cars on
the road. Besides, readers can gain invaluable knowledge in the construction, programming, and control of the six-legged robot.
The book also presents the controllers and aerodynamics of several different types of rotorcrafts. It includes the simulation and
flight of the various kinds of rotor-propelled air vehicles under each of their different aerodynamics environment. The book is
suitable for academia, educators, students, and researchers who are interested in autonomous vehicles, robotics, and rotor-
propelled vehicles.

GaN Transistors for Efficient Power Conversion

Grid converters are the key player in renewable energy integration. The high penetration of renewable energy systems is calling
for new more stringent grid requirements. As a consequence, the grid converters should be able to exhibit advanced functions
like: dynamic control of active and reactive power, operation within a wide range of voltage and frequency, voltage ride-through
capability, reactive current injection during faults, grid services support. This book explains the topologies, modulation and
control of grid converters for both photovoltaic and wind power applications. In addition to power electronics, this book focuses
on the specific applications in photovoltaic wind power systems where grid condition is an essential factor. With a review of the
most recent grid requirements for photovoltaic and wind power systems, the book discusses these other relevant issues: modern
grid inverter topologies for photovoltaic and wind turbines islanding detection methods for photovoltaic systems
synchronization techniques based on second order generalized integrators (SOGI) advanced synchronization techniques with
robust operation under grid unbalance condition grid filter design and active damping techniques power control under grid
fault conditions, considering both positive and negative sequences Grid Converters for Photovoltaic and Wind Power Systems is
intended as a coursework for graduated students with a background in electrical engineering and also for professionals in the
evolving renewable energy industry. For people from academia interested in adopting the course, a set of slides is available for
download from the website. www.wiley.com/go/grid_converters
The Advent of Unmanned Electric Vehicles

“Continuous, clean, and uninterrupted power and cooling is the lifeblood of any data center, especially one that operates 24 hours a day, 7 days a week. Critical enterprise power is the power without which an organization would quickly be unable to achieve its business objectives. Today, more than ever, enterprises of all types and sizes are demanding 24-hour system availability. This means enterprises must have 24-hour power and cooling day after day, year after year. One such example is the banking and financial services industry. Business practices mandate continuous uptime for all computer and network equipment to facilitate round-the-clock trading and banking processes anywhere, and everywhere, from any device in the world. Banking and financial service firms are completely intolerant of unscheduled downtime, given the guaranteed loss of business that invariably results. However, providing the best equipment is not enough to ensure 24-hour operation throughout the year. The goal is to achieve reliable 24-hour power, cooling, and processing at all times, regardless of the technological sophistication of the equipment or the demands placed upon that equipment by the end-user, be it business or municipality”.–

High Performance Control of AC Drives with Matlab/Simulink

Hybrid energy systems integrate multiple sources of power generation, storage, and transport mechanisms and can facilitate increased usage of cleaner, renewable, and more efficient energy sources. Hybrid Power: Generation, Storage, and Grids discusses hybrid energy systems from fundamentals through applications and discusses generation, storage, and grids. Highlights fundamentals and applications of hybrid energy storage Discusses use in hybrid and electric vehicles and home energy needs Discusses issues related to hybrid renewable energy systems connected to the utility grid Describes the usefulness of hybrid microgrids and various forms of off-grid energy such as mini-grids, nanogrids, and stand-alone systems Covers the use of hybrid renewable energy systems for rural electrification around the world Discusses various forms and applications of hybrid energy systems, hybrid energy storage, hybrid microgrids, and hybrid off-grid energy systems Details simulation and optimization of hybrid renewable energy systems This book is aimed at advanced students and researchers in academia, government, and industry, seeking a comprehensive overview of the basics, technologies, and applications of hybrid energy systems.

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