

Kinematic Gauging Railway Vehicles Rssb

This open access book, edited and authored by a team of world-leading researchers, provides a broad overview of advanced photonic methods for nanoscale visualization, as well as describing a range of fascinating in-depth studies. Introductory chapters cover the most relevant physics and basic methods that young researchers need to master in order to work effectively in the field of nanoscale photonic imaging, from physical first principles, to instrumentation, to mathematical foundations of imaging and data analysis. Subsequent chapters demonstrate how these cutting edge methods are applied to a variety of systems, including complex fluids and biomolecular systems, for visualizing their structure and dynamics, in space and on timescales extending over many orders of magnitude down to the femtosecond range. Progress in nanoscale photonic imaging in Göttingen has been the sum total of more than a decade of work by a wide range of scientists and mathematicians across disciplines, working together in a vibrant collaboration of a kind rarely matched. This volume presents the highlights of their research achievements and serves as a record of the unique and remarkable constellation of contributors, as well as looking ahead at the future prospects in this field. It will serve not only as a useful

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reference for experienced researchers but also as a valuable point of entry for newcomers.

The Rail Technical Strategy is a long-term vision of the railway as a system, which identifies the challenges that will have to be met over the next 30 years, which should be read alongside the 2007 White Paper 'Delivering a Sustainable Railway'. It starts by looking at the needs and requirements, including the strategic drivers and future traffic types, before examining the characteristics of a future railway system. Amongst the key themes is the need for a more precisely engineered system that can be run to maximum capacity and improve environmental performance. The final section looks at the ways the strategy can be implemented.

The field of control provides the principles and methods used to design physical and information systems that maintain desirable performance by sensing and automatically adapting to changes in the environment. This report spells out some of the prospects for control in the current and future technological environment, describes the role the field will play in military, commercial, and scientific applications over the next decade, and recommends actions required to enable new breakthroughs in engineering and technology through the application of control research. This brief yet thorough report provides renewed vision, a

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detailed list of new application areas, and specific recommendations for future research directions in control, dynamics, and systems, compiled by experts in the field.

Handbook of Railway Vehicle Dynamics, Second Edition, provides expanded, fully updated coverage of railway vehicle dynamics. With chapters by international experts, this work surveys the main areas of rolling stock and locomotive dynamics. Through mathematical analysis and numerous practical examples, it builds a deep understanding of the wheel-rail interface, suspension and suspension component design, simulation and testing of electrical and mechanical systems, and interaction with the surrounding infrastructure, and noise and vibration. Topics added in the Second Edition include magnetic levitation, rail vehicle aerodynamics, and advances in traction and braking for full trains and individual vehicles.

This proceedings volume explores the latest advances in transport and logistics, while also discussing the applications of modern information technologies, telecommunications, electronics, and prospective research methods and analyzing their impacts on society and the environment, which in turn determine the future development of these technologies. The book is intended for a broad readership, including transport and logistics business planners and technical

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experts, leveraging industry knowledge and facilitating technology adoption in promising business regions and transit corridors such as Ukraine, Kazakhstan, and others. The authors, who include policy planners and crafters as well as education and training professionals, address various types of intermodal transport such as rail, road, maritime, air, etc.

This book presents current world thinking on the design and construction of large covered spaces. By drawing together contributions on particular design issues from internationally renowned projects directly from the designers, architects and engineers responsible for those schemes, readers are offered insights into many of the most innovative construction design projects of recent years. Technologies explored include the advances within stressed membrane roofing, atria and glass structures, with a focus on international developments. The book also addresses the problems of construction associated with these ambitious and vast projects and the attendant environmental issues and concerns that are raised with such high-profile schemes. This book is an essential addition to the literature in the field of progressive construction design and will appeal broadly to architects, engineers, environmentalists, designers and constructors.

Operational Readiness Assessment

Covering both physical as well as mathematical and algorithmic foundations, this

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graduate textbook provides the reader with an introduction into modern biomedical imaging and image processing and reconstruction. These techniques are not only based on advanced instrumentation for image acquisition, but equally on new developments in image processing and reconstruction to extract relevant information from recorded data. To this end, the present book offers a quantitative treatise of radiography, computed tomography, and medical physics. Contents Introduction Digital image processing Essentials of medical x-ray physics Tomography Radiobiology, radiotherapy, and radiation protection Phase contrast radiography Object reconstruction under nonideal conditions

Handbook of Railway Vehicle Dynamics, Second Edition CRC Press

Friction stir welding (FSW) is a highly important and recently developed joining technology that produces a solid phase bond. It uses a rotating tool to generate frictional heat that causes material of the components to be welded to soften without reaching the melting point and allows the tool to move along the weld line. Plasticized material is transferred from the leading edge to trailing edge of the tool probe, leaving a solid phase bond between the two parts. Friction stir welding: from basics to applications reviews the fundamentals of the process and how it is used in industrial applications. Part one discusses general issues with chapters on topics such as basic process overview, material deformation and joint formation in friction stir welding, inspection and quality control and friction stir welding equipment requirements and

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machinery descriptions as well as industrial applications of friction stir welding. A chapter giving an outlook on the future of friction stir welding is included in Part one. Part two reviews the variables in friction stir welding including residual stresses in friction stir welding, effects and defects of friction stir welds, modelling thermal properties in friction stir welding and metallurgy and weld performance. With its distinguished editors and international team of contributors, Friction stir welding: from basics to applications is a standard reference for mechanical, welding and materials engineers in the aerospace, automotive, railway, shipbuilding, nuclear and other metal fabrication industries, particularly those that use aluminium alloys. Provides essential information on topics such as basic process overview, materials deformation and joint formation in friction stir welding Inspection and quality control and friction stir welding equipment requirements are discussed as well as industrial applications of friction stir welding Reviews the variables involved in friction stir welding including residual stresses, effects and defects of friction stir welds, modelling thermal properties, metallurgy and weld performance

This volume contains the results of the Manchester Benchmarking exercise for railway vehicle dynamics simulation packages. Five of the main computer packages currently used for this purpose were examined in the exercise and the results are presented in the form of tables and graphs.

This book will assess and compare several options for ammonia co-fueling of diesel

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locomotives with integrated heat recovery, multigeneration (including on-board hydrogen fuel production from ammonia), and emission reduction subsystems from energy, exergy, and environmental perspectives. Economic considerations will be presented to compare the cost of the proposed systems for different scenarios such as carbon-tax rates, diesel fuel cost and ammonia cost. Fossil fuel consumption and the associated negative environmental impact of their combustion is a significant global concern that requires effective, practical, and sustainable solutions. From a Canadian perspective, the Transportation Sector contributes more than 25% of national greenhouse gas emissions due to fossil fuel combustion, largely due to road vehicles (cars, light and heavy duty trucks). This is a complex and critical challenge to address, particularly in urban areas with high population density. There is a need to develop alternative energy solutions for mass passenger and freight transportation systems that will reduce both the traffic-volume of road vehicles as well as the emissions from the mass transportation systems. The book will be helpful to students in senior-level undergraduate and graduate level courses related to energy, thermodynamics, thermal sciences, combustion, HVAC&R, etc. The quantitative comparative assessment of such alternative energy systems provided by this book will be useful for researchers and professionals interested sustainable development.

This new resource presents a comprehensive view of radio-frequency (RF) positioning. The book is organized to allow readers to progress at a fast pace, from the

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fundamentals of RF positioning, to the use of advanced tools such as artificial intelligence algorithms and application development environments. The first part of the book covers the fundamentals of RF localization. The second part addresses the application of those fundamentals in several types of wireless networks and technologies as Cellular Networks, Wi-Fi, Bluetooth, Sensor Networks, Ultra Wide Band, and Global Navigation Satellite Systems. The third part brings several tools to allow rapid development of positioning applications for mobile devices, as well as to support implementation, usage, deployment, and research of localization algorithms. This book presents numerous MATLAB examples, accompanied by the corresponding MATLAB code, made available at the book website. The MATLAB code to most figures is also provided, as well as databases of measurements collected during experiments conducted both in cellular and Wi-Fi networks. The book also is accompanied by Android source codes of the example apps developed in Chapter 10.

Fatigue is a major issue affecting safety and quality of service in the railway industry. This book reviews key aspects of this important subject. It begins by providing an overview of the subject, discussing fatigue at the wheel-rail interface and in other aspects of infrastructure. It then considers fatigue in railway and tramway track, looking at causes of potential failure in such areas as rails and fixings as well as sleepers. It also reviews failure points in structures such as embankments and cuttings. The book analyses fatigue in railway bridges, looking in particular at masonry arch bridges as well

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as metal and concrete bridges. Two final chapters review safety and reliability issues affecting escalators and lifts. Fatigue in railway infrastructure is a helpful reference for those in the railway industry responsible for infrastructure maintenance as well as those researching this important subject. Provides a concise review of fatigue in the railway infrastructure Examines the causes of potential failure in rails, fixings and sleepers Analyses fatigue in railway bridges including masonry arch, metal and concrete structures

Fourth edition of the industry-renowned Railway Engineering Encyclopaedia. Expanded, enhanced, fully cross-referenced and illustrated throughout this is an indispensable book for minister, professional, trainee and enthusiast alike.

This outstanding thesis characterises the aerodynamic flow around a container freight train; investigating how changing container loading configurations affect the magnitude of aerodynamic forces measured on a container. 1/25th scale moving-model freight train experiments were carried out at the University of Birmingham's TRAIN rig facility to investigate slipstream velocities and static pressure, as well as measuring, using a specifically designed on-board pressure monitoring system, the aerodynamic loads on containers. Results were compared with full scale data and assessed in terms European standards for trackside worker and passenger safety limits. Rail vehicle aerodynamic studies have tended to previously focus on high speed passenger trains in line with increases in train speed. The research presented within this thesis highlights

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the issues associated with the aerodynamic development around a freight train, providing the foundations for further research and a basis from which to develop international safety standards in relation to freight, as well as high speed trains. Train Aerodynamics: Fundamentals and Applications is the first reference to provide a comprehensive overview of train aerodynamics with full scale data results. With the most up-to-date information on recent advances and the possibilities of improvement in railway facilities, this book will benefit railway engineers, train operators, train manufacturers, infrastructure managers and researchers of train aerodynamics. As the subject of train aerodynamics has evolved slowly over the last few decades with train speeds gradually increasing, and as a result of increasing interest in new train types and high-speed lines, this book provides a timely resource on the topic. Examines the fundamentals and the state-of-the-art of train aerodynamics, beginning with experimental, numerical and analytical tools, and then thoroughly discussing the specific approaches in other sections Features the latest developments and progress in computational aerodynamics and experimental facilities Addresses problems relating to train aerodynamics, from the dimensioning of railway structures and trains, to risk analysis related to safety issues and maintenance Discusses basic flow patterns caused by bridges and embankments`From understanding the Carnot Cycle in power plants and electrochemical processes in fuel cells to examining waste heat recovery within industry, this is the "go to" book for

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those wanting to explore the many surprising opportunities for improving energy efficiency'. John A. 'Skip' Laitner, Director of Economic and Social Analysis, American Council for an Energy-Efficient Economy, USA 'Scientific understanding and technological options can provide a successful approach to energy for sustainable development. What are needed are political will, financial commitment and social readiness. This book is essential in today's debate.' Thomas B. Johansson, Professor, Lund University, Sweden 'Energy Efficiency and the Demand for Energy Services is remarkable for the scope of its coverage - the whole problem, not just a slice - and its depth, clarity and approachability. It will serve as an excellent textbook for a wide range of energy-related university-level courses.' John Straube, Associate Professor, Department of Civil Engineering and School of Architecture, University of Waterloo, Canada Reducing and managing humanity's demand for energy is a fundamental part of the effort to mitigate climate change. In this, the most comprehensive textbook ever written on the subject, L. D. Danny Harvey lays out the theory and practice of how things must change if we are to meet our energy needs sustainably. The book begins with a succinct summary of the scientific basis for concern over global warming, then outlines energy basics and current patterns and trends in energy use. This is followed by a discussion of current and advanced technologies for the generation of electricity from fossil fuels. The findings from these sector-by-sector assessments are then applied to generate scenarios of how global energy demand could evolve over the

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coming decades with full implementation of the economically feasible energy-saving potential. The book ends with a brief discussion of policies that can be used to reduce energy demand, but also addresses the limits of technologically based improvements in efficiency in moderating demand and of the need to rethink some of our underlying assumptions concerning what we really need. Along with its companion volume on carbon-free energy supply, and accompanied by extensive supplementary online material, this is an essential resource for students and practitioners in engineering, architecture, environment and energy-related fields.

Rolling contact fatigue : a comprehensive review /

The broad and developing scope of human factors and ergonomics - the application of scientific knowledge to improve peoples interaction with products, systems and environments - has been illustrated for 28 years by the books which make up the Contemporary Ergonomics series. This book presents the proceedings of the international conference Ergon

The Handbook of RAMS in Railway Systems: Theory and Practice addresses the complexity in today's railway systems, which use computers and electromechanical components to increase efficiency while ensuring a high level of safety. RAM (Reliability, Availability, Maintainability) addresses the specifications and standards that manufacturers and operators have to meet. Modeling, implementation, and assessment of RAM and safety requires the integration of railway engineering systems;

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mathematical and statistical methods; standards compliance; and financial/economic factors. This Handbook brings together a group of experts to present RAM and safety in a modern, comprehensive manner.

Many of the engineering problems of particular importance to railways arise at interfaces and the safety-critical role of the wheel/rail interface is widely acknowledged. Better understanding of wheel/rail interfaces is therefore critical to improving the capacity, reliability and safety of the railway system. Wheel-rail interface handbook is a one-stop reference for railway engineering practitioners and academic researchers. Part one provides the fundamentals of contact mechanics, wear, fatigue and lubrication as well as state-of-the-art research and emerging technologies related to the wheel/rail interface and its management. Part two offers an overview of industrial practice from several different regions of the world, thereby providing an invaluable international perspective with practitioners' experience of managing the wheel/rail interface in a variety of environments and circumstances. This comprehensive volume will enable practising railway engineers, in whatever discipline of railway engineering – infrastructure, vehicle design and safety, and so on – to enhance their understanding of wheel/rail issues, which have a major influence on the running of a reliable, efficient and safe railway. One-stop reference on the important topic of wheel rail-interfaces Presents the fundamentals of contact mechanics, wear, fatigue and lubrication Examines state-of-the-art research and emerging technologies related to wheel-rail interface and its management This is the only current and in print book covering the full field of transit systems and technology. Beginning with a history of transit and its role in urban development, the book proceeds to define relevant terms and concepts, and then present detailed coverage of all

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urban transit modes and the most efficient system designs for each. Including coverage of such integral subjects as travel time, vehicle propulsion, system integration, fully supported with equations and analytical methods, this book is the primary resource for students of transit as well as those professionals who design and operate these key pieces of urban infrastructure.

The IAVSD Symposium is the leading international conference in the field of ground vehicle dynamics, bringing together scientists and engineers from academia and industry. The biennial IAVSD symposia have been held in internationally renowned locations. In 2015 the 24th Symposium of the International Association for Vehicle System Dynamics (IAVSD) was held in Graz, Austria, from 17th to 21st of August 2015. The symposium was hosted by VIRTUAL VEHICLE Research Center, in cooperation with the Graz and Vienna Universities of Technology, and the industrial partners AVL, Magna Steyr, and Siemens. 170 papers (oral and poster presentations) were presented at the symposium and the papers are now published in these proceedings. The papers review the latest research developments and practical applications in highly relevant areas of vehicle dynamics on roads and tracks, and may serve as a reference for researchers and engineers active in the field of vehicle system dynamics. These proceedings demonstrate the increasing interest and importance of contact mechanics and wear to the railway industry. The 27 contributions succeed in sustaining a balance between mechanics and metallurgy, theory and practice, and will be of considerable interest to those engaged in research, as well as practising engineers.

The track structure, rails, switches and crossings account for more than 50% of maintenance and renewal costs for the rail industry. To improve the competitiveness of rail transportation,

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the cost-efficiency of these areas needs to be addressed. This is the background to INNOTRACK, an integrated research project funded by the European Commission's 6th research framework programme. Running from September 2006 to December 2009, INNOTRACK has developed a multitude of innovative solutions in the areas of track substructure, rails & welds, and switches & crossings. The solutions have been assessed from technical, logistics and life cycle cost point of views.

Incorporates More Than 25 Years of Research and Experience Railway Transportation Systems: Design, Construction and Operation presents a comprehensive overview of railway passenger and freight transport systems, from design through to construction and operation. It covers the range of railway passenger systems, from conventional and high speed inter-urban systems through to suburban, regional and urban ones. Moreover, it thoroughly covers freight railway systems transporting conventional loads, heavy loads and dangerous goods. For each system it provides a definition, a brief overview of its evolution and examples of good practice, the main design, construction and operational characteristics, the preconditions for its selection, and the steps required to check the feasibility of its implementation. Developed for Engineers, Designers, and Operators of Railway Systems The book also provides a general overview of issues related to safety, interface with the environment, cutting-edge technologies, and finally the techniques that govern the stability and guidance of railway vehicles on track. Contains information on the three main constituents of all railway systems: railway infrastructure, rolling stock, railway operations Provides a methodology for testing the applicability of the implementation of railway systems Offers an overview of issues related to the safety of railway systems in general Describes their interfaces with the environment, the

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cutting-edge technologies that are already in place as well as those that are under research, and the techniques that govern the stability and guidance of railway vehicles on track Railway Transportation Systems: Design, Construction and Operation suits students, and also those in the industry ? engineers, consultants, manufacturers, transport company executives ? who need some breadth of knowledge to guide them over the course of their careers.

This book gathers together papers presented at the 26th IAVSD Symposium on Dynamics of Vehicles on Roads and Tracks, held on August 12 – 16, 2019, at the Lindholmen Conference Centre in Gothenburg, Sweden. It covers cutting-edge issues related to vehicle systems, including vehicle design, condition monitoring, wheel and rail contact, automated driving systems, suspension and ride analysis, and many more topics. Written by researchers and practitioners, the book offers a timely reference guide to the field of vehicle systems dynamics, and a source of inspiration for future research and collaborations.

This open access book reports on innovative methods, technologies and strategies for mastering uncertainty in technical systems. Despite the fact that current research on uncertainty is mainly focusing on uncertainty quantification and analysis, this book gives emphasis to innovative ways to master uncertainty in engineering design, production and product usage alike. It gathers authoritative contributions by more than 30 scientists reporting on years of research in the areas of engineering, applied mathematics and law, thus offering a timely, comprehensive and multidisciplinary account of theories and methods for quantifying data, model and structural uncertainty, and of fundamental strategies for mastering uncertainty. It covers key concepts such as robustness, flexibility and resilience in detail. All the described methods, technologies and strategies have been validated with the help of three technical

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systems, i.e. the Modular Active Spring-Damper System, the Active Air Spring and the 3D Servo Press, which have been in turn developed and tested during more than ten years of cooperative research. Overall, this book offers a timely, practice-oriented reference guide to graduate students, researchers and professionals dealing with uncertainty in the broad field of mechanical engineering.

There is an increasing dissatisfaction about how risk is regulated, leading to vivid debates about the use of 'risk assessment' and 'precaution'. As a result, academics, government officials and industry leaders are calling for new approaches and fresh ideas. This book provides a historical and topical perspective on the alternative concept of 'Tolerability of Risk' and its concrete regulatory applications. In the UK, Tolerability of Risk has been developed into a sophisticated framework, particularly within the health and safety sectors. It is expected to guide decision-makers when applying their legal obligation of keeping risks as low as practically reasonable. Could Tolerability of Risk become a wider source of inspiration across the full scope of risk analysis and management? Written by leading academics and risk practitioners from industry and government, *The Tolerability of Risk* presents a summary of theoretical perspectives on risk approaches, providing a detailed elicitation of the methods and approaches used to build the Tolerability of Risk framework and examining the prospect of universal application of that framework. From nuclear power to environmental pollution, climate change and drug testing, the Tolerability of Risk framework may offer a workable, pragmatic solution for balancing risks against the costs involved in controlling them, as well as developing the institutional capacity to make effective decisions in all jurisdictions worldwide.

Presenting the Proceedings of the Ergonomics Society's annual conference, the series

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embraces the wide range of topics covered by ergonomics. Individual papers provide insight into current practice, present new research findings and form an invaluable reference source. A wide range of topics are covered in these proceedings, including Ergonomics, H
This book on the dynamics of rail vehicles is developed from the manuscripts for a class with the same name at TU Berlin. It is directed mainly to master students with pre-knowledge in mathematics and mechanics and engineers that want to learn more. The important phenomena of the running behaviour of rail vehicles are derived and explained. Also recent research results and experience from the operation of rail vehicles are included. One focus is the description of the complex wheel-rail contact phenomena that are essential to understand the concept of running stability and curving. A reader should in the end be able to understand the background of simulation tools that are used by the railway industry and universities today.

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