

PHYSICAL SCIENCES P.1

MEMO-2024



basic education

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NATIONAL
SENIOR CERTIFICATE

1 times by adding different masses to increase the hanging mass each time.
the effects of air friction.



data obtained were used to draw the sketch graph below.



length. The spring then falls to the ground.
Trolley A moves to the left, while trolley B moves to the right and then up a frictionless inclined plane, rising to a maximum vertical height of 1,5 m, as shown in the diagram below.



- 6.1 Write down the principle of conservation of mechanical energy in words. (2)
- 6.2 Calculate the speed of trolley B at the bottom of the inclined plane. (4)
- 6.3 For the hypothesis that the spring takes no time to return to its natural length.

(4 new pages.)

1 applied at an angle of 30° to the horizontal
ly at rest, as shown in the diagram below.

on of 10 N acts on the crate as it moves from rest at point A ab
point B. The distance between point A and point B is 1,5
at point B is 2 m s^{-1} .



is work done by a force.

of free-body diagram showing ALL the forces acting on the crate.

IF PRINCIPLES ONLY, calculate the magnitude of force F.

November 2013 Physics Paper 1 Memo

Michal Rosen-Zvi

A red circular graphic with a gradient, appearing as a semi-circle or a partial circle, located to the right of the name Michal Rosen-Zvi.

November 2013 Physics Paper 1 Memo:

Decision Making and Knowledge Decision Support Systems Anna Maria Gil-Lafuente, Constantin

Zopounidis, 2014-12-01 This book presents recent advancements of research new methods and techniques applications and projects in decision making and decision support systems It explores expert systems and neural networks knowledge engineering and management fuzzy sets and systems and computational methods for optimization data analysis and decision making It presents applications in Economics Finance Management and Engineering The book undertakes to stimulate scientific exchange ideas and experiences in the field of decision making in Economy and Management Researchers and practitioners alike will benefit from this book when they are dealing with imprecision vagueness and uncertainty in the context of decision making

Formality of the Little $\mathbb{A}_1$ -disks Operad Pascal Lambrechts, Ismar Volić, 2014-06-05

The little disks operad along with its variants is an important tool in homotopy theory It is defined in terms of configurations of disjoint dimensional disks inside the standard unit disk in $\mathbb{R}^n$ and it was initially conceived for detecting and understanding fold loop spaces Its many uses now stretch across a variety of disciplines including topology algebra and mathematical physics In this paper the authors develop the details of Kontsevich's proof of the formality of little disks operad over the field of real numbers More precisely one can consider the singular chains on as well as the singular homology of These two objects are operads in the category of chain complexes The formality then states that there is a zig zag of quasi isomorphisms connecting these two operads The formality also in some sense holds in the category of commutative differential graded algebras The authors additionally prove a relative version of the formality for the inclusion of the little disks operad in the little disks operad when

Spacecraft Dynamics and Control Enrico Canuto, Carlo Novara, Donato Carlucci, Carlos

Perez-Montenegro, Luca Massotti, 2018-03-08 Spacecraft Dynamics and Control The Embedded Model Control Approach provides a uniform and systematic way of approaching space engineering control problems from the standpoint of model based control using state space equations as the key paradigm for simulation design and implementation The book introduces the Embedded Model Control methodology for the design and implementation of attitude and orbit control systems The logic architecture is organized around the embedded model of the spacecraft and its surrounding environment The model is compelled to include disturbance dynamics as a repository of the uncertainty that the control law must reject to meet attitude and orbit requirements within the uncertainty class The source of the real time uncertainty estimation prediction is the model error signal as it encodes the residual discrepancies between spacecraft measurements and model output The embedded model and the uncertainty estimation feedback noise estimator in the book constitute the state predictor feeding the control law Asymptotic pole placement exploiting the asymptotes of closed loop transfer functions is the way to design and tune feedback loops around the embedded model state predictor control law reference generator The design versus the uncertainty class is driven by analytic stability and performance inequalities The method is applied to

several attitude and orbit control problems The book begins with an extensive introduction to attitude geometry and algebra and ends with the core themes state space dynamics and Embedded Model Control Fundamentals of orbit attitude and environment dynamics are treated giving emphasis to state space formulation disturbance dynamics state feedback and prediction closed loop stability Sensors and actuators are treated giving emphasis to their dynamics and modelling of measurement errors Numerical tables are included and their data employed for numerical simulations Orbit and attitude control problems of the European GOCE mission are the inspiration of numerical exercises and simulations The suite of the attitude control modes of a GOCE like mission is designed and simulated around the so called mission state predictor Solved and unsolved exercises are included within the text and not separated at the end of chapters for better understanding training and application Simulated results and their graphical plots are developed through MATLAB Simulink code

Tunnel Visions Michael Riordan,Lilian Hoddson,Arienne W. Kolb,2015-11-20 A detailed and engaging account of the development of the superconducting supercollider one of the largest scientific undertakings in the United States Journal of American History Starting in the 1950s US physicists dominated the search for elementary particles aided by the association of this research with national security they held this position for decades In an effort to maintain their hegemony and track down the elusive Higgs boson they convinced President Reagan and Congress to support construction of the multibillion dollar Superconducting Super Collider project in Texas the largest basic science project ever attempted But after the Cold War ended and the estimated SSC cost surpassed ten billion dollars Congress terminated the project in October 1993 Drawing on extensive archival research contemporaneous press accounts and over one hundred interviews with scientists engineers government officials and others involved Tunnel Visions tells the riveting story of the aborted SSC project The authors examine the complex interrelated causes for its demise including problems of large project management continuing cost overruns and lack of foreign contributions In doing so they ask whether Big Science has become too large and expensive including whether academic scientists and their government overseers can effectively manage such an enormous undertaking Focusing on the scientific technical and political conflicts that led to delays ever rising costs and eventually the SSC s cancelation by Congress Tunnel Visions is a true techno thriller Burton Richter winner of the Nobel Prize in Physics Most good science stories are tales of discovery and success but failure can be just as riveting Here two historians and an archivist describe the greatest particle physics experiment that never was Scientific American **Law, Death, and Robots** Keri Grieman,2024-10-17 Can the law keep up with AI This book examines liability and regulation for artificial intelligence causing serious physical harm both now and in the future While AI moves quickly regulation follows more slowly an increasing problem for an evolutionary fast paced emerging technology AI has the potential to save lives but in doing so will have the potential to take them as well How do we future proof law and regulation to incentivise life saving innovation as safely as possible This book details how to regulate AI in high risk civil applications for example automated vehicles and

medicine addressing both liability and regulatory structure It highlights crucial liability themes for technology governance provides tools to bridge the gap between regulators and technologists examines jurisdictional approaches to AI regulation in the EU UK USA and Singapore and ultimately suggests a jurisdiction agnostic blueprint for regulation **On Mars** Edward Clinton Ezell,Linda Neuman Ezell,2013-02-19 Although it was only designed for a ninety day surface mission the Viking 1 lander ultimately transmitted science messages to Earth for seven years This authoritative history chronicles the remarkable achievements of the Viking program during its first three decades Commissioned by NASA it recounts the events surrounding the first planetary landing on Earth s closest neighbor and the first on site search for evidence of extraterrestrial life It also portrays a human drama in which thousands of professionals from government industry and academia joined together to accomplish the seemingly impossible This history begins with a survey of the qualities that make the surface and atmosphere of Mars prime targets for scientific investigation A retrospective of NASA s Mariner program follows detailing the series of robotic interplanetary probes that led to the initiation of the Viking program in 1968 The authors trace the ensuing technological developments including the first lander vehicles and orbiter They also profile the cooperation of managerial technical and scientific teams during the mission s data gathering and analysis phases The final chapters outline the scientific results of the Viking investigations examine some of the unresolved questions and consider possible future explorations Dozens of photos taken by Viking cameras illuminate the text Space Physics and Aeronomy, Space Weather Effects and Applications Anthea J. Coster,Philip J. Erickson,Louis J. Lanzerotti,2021-04-21 Examines how solar and terrestrial space phenomena affect sophisticated technological systems Contemporary society relies on sophisticated technologies to manage electricity distribution communication networks transportation safety and myriad other systems The successful design and operation of both ground based and space based systems must consider solar and terrestrial space phenomena and processes Space Weather Effects and Applications describes the effects of space weather on various present day technologies and explores how improved instrumentation to measure Earth s space environment can be used to more accurately forecast changes and disruptions Volume highlights include Damage and disruption to orbiting satellite equipment by solar particles and cosmic rays Effects of space radiation on aircraft at high altitudes and latitudes Response of radio and radar based systems to solar bursts Disturbances to the propagation of radio waves caused by space weather How geomagnetic field changes impact ground based systems such as pipelines Impacts of human exposure to the space radiation environment The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity Its publications disseminate scientific knowledge and provide resources for researchers students and professionals Find out more about the Space Physics and Aeronomy collection in this Q A with the Editors in Chief Thorium Energy for the World Jean-Pierre Revol,Maurice Bourquin,Yacine Kadi,Egil Lillestol,Jean-Christophe de Mestral,Karel Samec,2016-04-05 The Thorium Energy Conference ThEC13 gathered some of the world s leading experts on thorium technologies to review the

possibility of destroying nuclear waste in the short term and replacing the uranium fuel cycle in nuclear systems with the thorium fuel cycle in the long term The latter would provide abundant reliable and safe energy with no CO₂ production no air pollution and minimal waste production The participants representatives of 30 countries included Carlo Rubbia Nobel Prize Laureate in physics and inventor of the Energy Amplifier Jack Steinberger Nobel Prize Laureate in physics Hans Blix former Director General of the International Atomic Energy Agency IAEA Rolf Heuer Director General of CERN Pascal Couchepin former President of the Swiss Confederation and Claude Haegi President of the FEDRE to name just a few The ThEC13 proceedings are a source of reference on the use of thorium for energy generation They offer detailed technical reviews of the status of thorium energy technologies from basic R D to industrial developments They also describe how thorium can be used in critical reactors and in subcritical accelerator driven systems ADS answering the important questions Why is thorium so attractive and what is the role of innovation in particular in the nuclear energy domain What are the national and international R D programs on thorium technologies and how are they progressing ThEC13 was organized jointly by the international Thorium Energy Committee iThEC an association based in Geneva and the International Thorium Energy Organisation IThEO It was held in the Globe of Science and Innovation at the European Organization for Nuclear Research CERN Geneva Switzerland in October 2013

Crime, Violence, and Global Warming John Crank,Linda Jacoby,2015-05-20 Crime Violence and Global Warming introduces the many connections between climate change and criminal activity Conflict over natural resources can escalate to state and non state actors resulting in wars asymmetrical warfare and terrorism Crank and Jacoby apply criminological theory to each aspect of this complicated web helping readers to evaluate conflicting claims about global warming and to analyze evidence of the current and potential impact of climate change on conflict and crime Beginning with an overview of the science of global warming the authors move on to the links between climate change scarce resources and crime Their approach takes in the full scope of causes and consequences present and future in the United States and throughout the world The book concludes by looking ahead at the problem of forecasting future security implications if global warming continues or accelerates This fresh approach to the criminology of climate change challenges readers to examine all sides of this controversial question and to formulate their own analysis of our planet s future

Roadmapping Future Tuğrul U. Daim,2021-03-16 This volume presents a portfolio of cases and applications on technology roadmapping TRM for products and services It provides a brief overview on criteria or metrics used for evaluating the success level of TRM and then offers six case examples from sectors such as transportation smart technologies and household electronics A new innovation in this book is a section of detailed technology roadmap samples that technology managers can apply to emerging technologies

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web horse evolution domestication anatomy the history of the horse family equidae began during the eocene epoch eohippus hyracotherium was the first ancestral horse to appear the line leading from eohippus to equus the modern horse includes orhippus epihippus mesohippus miohippus parahippus merychippus and pliohippus

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web model answer the picture shows how a horse has evolved over millions of years overall the horse has become larger and the number of toes on its hooves has become fewer

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web it is claimed that the evolution of the horse can be traced from the tiny four toed hyracotherium sometimes called eohippus which supposedly lived about 50 million years ago to equus the single toed horse of today but this is a gross over simplification and ignores some facts latest answers

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web blog our services search for evolution of horse 1 horses are belong to genus a equus b perissodactyla c tylopoda d non 2 how many species present in genus equus a ten b eleven c seven d nine 3 asses and zebras are also belong to single genus

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web horse evolution was previously believed to be a linear progress but after more fossils were discovered it was determined the evolution of horses was more complex and multi branched horses have evolved from gradual change anagenesis as well as abrupt progression and division cladogenesis

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web allan sekula was born in erie pennsylvania in 1959 and was based in los angeles from 1985 until his death in 2013 he began his adult life in the years of protest against the vietnam war studying marxists thinkers such as herbert marcuse and went on to revitalise the american tradition of documentary photography and social criticism as an

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