

Research Article

Mantang Ma* and Ruyun Ma

Existence and multiplicity of solutions for second-order Dirichlet problems with nonlinear impulses

<https://doi.org/10.1515/math-2022-0519>

received June 25, 2022; accepted October 7, 2022

Abstract: We are concerned with Dirichlet problems of impulsive differential equations

$$\begin{cases} -u''(x) - \lambda u(x) + g(x, u(x)) + \sum_{j=1}^p I_j(u(x))\delta(x - \eta_j) = f(x) & \text{for a.e. } x \in (0, \pi), \\ u(0) = u(\pi) = 0, \end{cases}$$

where λ is a parameter and runs near 1, $f \in L^2(0, \pi)$, $I_j \in C(\mathbb{R}, \mathbb{R})$, $j = 1, 2, \dots, p$, $p \in \mathbb{N}$, the nonlinearity $g : [0, \pi] \times \mathbb{R} \rightarrow \mathbb{R}$ satisfies the Carathéodory condition, $\delta = \delta(x)$ denote the Dirac delta impulses concentrated at 0, which are applied at given points $0 < \eta_1 < \eta_2 < \dots < \eta_p < \pi$. We show the existence and multiplicity of solutions to the aforementioned problem for λ in a neighborhood of 1 by using degree theory and bifurcation theory.

Keywords: near resonance, impulsive differential equations, *a priori* bounds, bifurcation from infinity**MSC 2020:** 34B15, 34B37, 34C23

1 Introduction and main result

In this article, we are concerned with the existence and multiplicity of solutions for Dirichlet problems of impulsive differential equations

$$\begin{cases} -u''(x) - \lambda u(x) + g(x, u(x)) + \sum_{j=1}^p I_j(u(x))\delta(x - \eta_j) = f(x) & \text{for a.e. } x \in (0, \pi), \\ u(0) = u(\pi) = 0, \end{cases} \quad (1.1)$$

where λ is a parameter and runs near 1, $f \in L^2(0, \pi)$, $I_j : \mathbb{R} \rightarrow \mathbb{R}$ is continuous, $j = 1, 2, \dots, p$, $p \in \mathbb{N}$, the nonlinearity $g : [0, \pi] \times \mathbb{R} \rightarrow \mathbb{R}$ satisfies Carathéodory condition, $\delta = \delta(x)$ denote the Dirac delta impulses concentrated at 0, i.e., $\delta(x) = 0$ for $x \neq 0$, $\delta(0) = +\infty$, and $\int_{-\infty}^{+\infty} \delta(x)dx = 1$, the Dirac delta impulses δ are applied at given points $0 < \eta_1 < \eta_2 < \dots < \eta_p < \pi$.

In recent years, the existence and multiplicity of solutions for problem (1.1) with $I_j = 0$, $j = 1, 2, \dots, p$, have been extensively studied by many authors, see [1–6] and references therein. In particular, Mawhin and Schmitt [1] studied the Dirichlet problem with the parameter λ near the principal eigenvalue of the form:

* Corresponding author: Mantang Ma, Department of Mathematics, Northwest Normal University, Lanzhou 730070, P. R. China, e-mail: mantangma@163.com

Ruyun Ma: Department of Mathematics, Northwest Normal University, Lanzhou 730070, P. R. China, e-mail: mary@nwnu.edu.cn

Dirichlet Student Problems 2014 Solutions

S Ben Porath



Dirichlet Student Problems 2014 Solutions:

Advanced Transport Phenomena P. A. Ramachandran, 2014-09-25 An integrated modern approach to transport phenomena for graduate students featuring traditional and contemporary examples to demonstrate the diverse practical applications of the theory Written in an easy to follow style the basic principles of transport phenomena and model building are recapped in Chapters 1 and 2 before progressing logically through more advanced topics including physicochemical principles behind transport models Treatments of numerical analytical and computational solutions are presented side by side often with sample code in MATLAB to aid students understanding and develop their confidence in using computational skills to solve real world problems Learning objectives and mathematical prerequisites at the beginning of chapters orient students to what is required in the chapter and summaries and over 400 end of chapter problems help them retain the key points and check their understanding Online supplementary material including solutions to problems for instructors supplementary reading material sample computer codes and case studies complete the package

Nonlocal and Nonlinear Diffusions and Interactions: New Methods and Directions José Antonio Carrillo, Manuel del Pino, Alessio Figalli, Giuseppe Mingione, Juan Luis Vázquez, 2017-10-03 Presenting a selection of topics in the area of nonlocal and nonlinear diffusions this book places a particular emphasis on new emerging subjects such as nonlocal operators in stationary and evolutionary problems and their applications swarming models and applications to biology and mathematical physics and nonlocal variational problems The authors are some of the most well known mathematicians in this innovative field which is presently undergoing rapid development The intended audience includes experts in elliptic and parabolic equations who are interested in extending their expertise to the nonlinear setting as well as Ph D or postdoctoral students who want to enter into the most promising research topics in the field

Artificial Intelligence in STEM Education Fan Ouyang, Pengcheng Jiao, Bruce M. McLaren, Amir H. Alavi, 2022-12-29 Artificial intelligence AI opens new opportunities for STEM education in K 12 higher education and professional education contexts This book summarizes AI in education AIED with a particular focus on the research practice and technological paradigmatic shifts of AIED in recent years The 23 chapters in this edited collection track the paradigmatic shifts of AIED in STEM education discussing how and why the paradigms have shifted explaining how and in what ways AI techniques have ensured the shifts and envisioning what directions next generation AIED is heading in the new era As a whole the book illuminates the main paradigms of AI in STEM education summarizes the AI enhanced techniques and applications used to enable the paradigms and discusses AI enhanced teaching learning and design in STEM education It provides an adapted educational policy so that practitioners can better facilitate the application of AI in STEM education This book is a must read for researchers educators students designers and engineers who are interested in the opportunities and challenges of AI in STEM education

Non-Formal and Informal Science Learning in the ICT Era Michail Giannakos, 2020-09-14 This book introduces the reader to evidence based non

formal and informal science learning considerations including technological and pedagogical innovations that have emerged in and empowered the information and communications technology ICT era The contributions come from diverse countries and contexts such as hackerspaces museums makerspaces after school activities to support a wide range of educators practitioners and researchers such as K 12 teachers learning scientists museum curators librarians parents hobbyists The documented considerations lessons learned and concepts have been extracted using diverse methods ranging from experience reports and conceptual methods to quantitative studies and field observation using qualitative methods This volume attempts to support the preparation set up implementation but also evaluation of informal learning activities to enhance science education

Mathematical Reviews ,1986 Dissertation Abstracts International ,1970 *Monthly Index of Russian Accessions* Library of Congress. Processing Department,1968 **Comprehensive Dissertation Index, 1861-1972: Mathematics and statistics** Xerox University Microfilms,1973 **Monthly Index of Russian Accessions** ,1958 **Dirichlet Student Problems** ,2015 **Government Reports Announcements & Index** ,1988-08 Current Index to Statistics, Applications, Methods and Theory ,1998 The Current Index to Statistics CIS is a bibliographic index of publications in statistics probability and related fields *Infinitely Many Solutions to Asymmetric, Polyharmonic Dirichlet Problems* Edger Sterjo,2018 **Numerical Treatment of Dirichlet Problems with Several Solutions** Rita Meyer-Spasche,1976 *Smoothness properties of solutions to Dirichlet problems in non-smooth* Vilhelm Adolfsson,1989

Ordvac Solutions of the Dirichlet Problem David M. Young,1955 An Approximate Solution to the Dirichlet Problem Edward William Redwine,1964 **The Numerical Solution of Dirichlet Problems With Axisymmetry By an Integral Equation Method** P. J. Fielding,M. K. Bevir,1975 Solution of the Dirichlet Problem in Parallel Slit Domains ,1963 *Numerical Solution of the Dirichlet Problem for the N-sphere* Patrick James Daly,1974

Delve into the emotional tapestry woven by Crafted by in Dive into the Emotion of **Dirichlet Student Problems 2014 Solutions** . This ebook, available for download in a PDF format (*), is more than just words on a page; it's a journey of connection and profound emotion. Immerse yourself in narratives that tug at your heartstrings. Download now to experience the pulse of each page and let your emotions run wild.

https://unauthorized.gulfbank.com/data/scholarship/Download_PDFS/nba%20highlights%20ebook.pdf

Table of Contents Dirichlet Student Problems 2014 Solutions

1. Understanding the eBook Dirichlet Student Problems 2014 Solutions
 - The Rise of Digital Reading Dirichlet Student Problems 2014 Solutions
 - Advantages of eBooks Over Traditional Books
2. Identifying Dirichlet Student Problems 2014 Solutions
 - Exploring Different Genres
 - Considering Fiction vs. Non-Fiction
 - Determining Your Reading Goals
3. Choosing the Right eBook Platform
 - Popular eBook Platforms
 - Features to Look for in an Dirichlet Student Problems 2014 Solutions
 - User-Friendly Interface
4. Exploring eBook Recommendations from Dirichlet Student Problems 2014 Solutions
 - Personalized Recommendations
 - Dirichlet Student Problems 2014 Solutions User Reviews and Ratings
 - Dirichlet Student Problems 2014 Solutions and Bestseller Lists
5. Accessing Dirichlet Student Problems 2014 Solutions Free and Paid eBooks
 - Dirichlet Student Problems 2014 Solutions Public Domain eBooks
 - Dirichlet Student Problems 2014 Solutions eBook Subscription Services
 - Dirichlet Student Problems 2014 Solutions Budget-Friendly Options

6. Navigating Dirichlet Student Problems 2014 Solutions eBook Formats
 - ePub, PDF, MOBI, and More
 - Dirichlet Student Problems 2014 Solutions Compatibility with Devices
 - Dirichlet Student Problems 2014 Solutions Enhanced eBook Features
7. Enhancing Your Reading Experience
 - Adjustable Fonts and Text Sizes of Dirichlet Student Problems 2014 Solutions
 - Highlighting and Note-Taking Dirichlet Student Problems 2014 Solutions
 - Interactive Elements Dirichlet Student Problems 2014 Solutions
8. Staying Engaged with Dirichlet Student Problems 2014 Solutions
 - Joining Online Reading Communities
 - Participating in Virtual Book Clubs
 - Following Authors and Publishers Dirichlet Student Problems 2014 Solutions
9. Balancing eBooks and Physical Books Dirichlet Student Problems 2014 Solutions
 - Benefits of a Digital Library
 - Creating a Diverse Reading Collection Dirichlet Student Problems 2014 Solutions
10. Overcoming Reading Challenges
 - Dealing with Digital Eye Strain
 - Minimizing Distractions
 - Managing Screen Time
11. Cultivating a Reading Routine Dirichlet Student Problems 2014 Solutions
 - Setting Reading Goals Dirichlet Student Problems 2014 Solutions
 - Carving Out Dedicated Reading Time
12. Sourcing Reliable Information of Dirichlet Student Problems 2014 Solutions
 - Fact-Checking eBook Content of Dirichlet Student Problems 2014 Solutions
 - Distinguishing Credible Sources
13. Promoting Lifelong Learning
 - Utilizing eBooks for Skill Development
 - Exploring Educational eBooks
14. Embracing eBook Trends
 - Integration of Multimedia Elements

- Interactive and Gamified eBooks

Dirichlet Student Problems 2014 Solutions Introduction

In this digital age, the convenience of accessing information at our fingertips has become a necessity. Whether its research papers, eBooks, or user manuals, PDF files have become the preferred format for sharing and reading documents. However, the cost associated with purchasing PDF files can sometimes be a barrier for many individuals and organizations. Thankfully, there are numerous websites and platforms that allow users to download free PDF files legally. In this article, we will explore some of the best platforms to download free PDFs. One of the most popular platforms to download free PDF files is Project Gutenberg. This online library offers over 60,000 free eBooks that are in the public domain. From classic literature to historical documents, Project Gutenberg provides a wide range of PDF files that can be downloaded and enjoyed on various devices. The website is user-friendly and allows users to search for specific titles or browse through different categories. Another reliable platform for downloading Dirichlet Student Problems 2014 Solutions free PDF files is Open Library. With its vast collection of over 1 million eBooks, Open Library has something for every reader. The website offers a seamless experience by providing options to borrow or download PDF files. Users simply need to create a free account to access this treasure trove of knowledge. Open Library also allows users to contribute by uploading and sharing their own PDF files, making it a collaborative platform for book enthusiasts. For those interested in academic resources, there are websites dedicated to providing free PDFs of research papers and scientific articles. One such website is Academia.edu, which allows researchers and scholars to share their work with a global audience. Users can download PDF files of research papers, theses, and dissertations covering a wide range of subjects. Academia.edu also provides a platform for discussions and networking within the academic community. When it comes to downloading Dirichlet Student Problems 2014 Solutions free PDF files of magazines, brochures, and catalogs, Issuu is a popular choice. This digital publishing platform hosts a vast collection of publications from around the world. Users can search for specific titles or explore various categories and genres. Issuu offers a seamless reading experience with its user-friendly interface and allows users to download PDF files for offline reading. Apart from dedicated platforms, search engines also play a crucial role in finding free PDF files. Google, for instance, has an advanced search feature that allows users to filter results by file type. By specifying the file type as "PDF," users can find websites that offer free PDF downloads on a specific topic. While downloading Dirichlet Student Problems 2014 Solutions free PDF files is convenient, its important to note that copyright laws must be respected. Always ensure that the PDF files you download are legally available for free. Many authors and publishers voluntarily provide free PDF versions of their work, but its essential to be cautious and verify the authenticity of the source before downloading Dirichlet Student Problems 2014 Solutions. In conclusion, the internet offers numerous platforms and websites that allow users to download

free PDF files legally. Whether its classic literature, research papers, or magazines, there is something for everyone. The platforms mentioned in this article, such as Project Gutenberg, Open Library, Academia.edu, and Issuu, provide access to a vast collection of PDF files. However, users should always be cautious and verify the legality of the source before downloading Dirichlet Student Problems 2014 Solutions any PDF files. With these platforms, the world of PDF downloads is just a click away.

FAQs About Dirichlet Student Problems 2014 Solutions Books

What is a Dirichlet Student Problems 2014 Solutions PDF? A PDF (Portable Document Format) is a file format developed by Adobe that preserves the layout and formatting of a document, regardless of the software, hardware, or operating system used to view or print it. **How do I create a Dirichlet Student Problems 2014 Solutions PDF?** There are several ways to create a PDF: Use software like Adobe Acrobat, Microsoft Word, or Google Docs, which often have built-in PDF creation tools. Print to PDF: Many applications and operating systems have a "Print to PDF" option that allows you to save a document as a PDF file instead of printing it on paper. Online converters: There are various online tools that can convert different file types to PDF. **How do I edit a Dirichlet Student Problems 2014 Solutions PDF?** Editing a PDF can be done with software like Adobe Acrobat, which allows direct editing of text, images, and other elements within the PDF. Some free tools, like PDFescape or Smallpdf, also offer basic editing capabilities. **How do I convert a Dirichlet Student Problems 2014 Solutions PDF to another file format?** There are multiple ways to convert a PDF to another format: Use online converters like Smallpdf, Zamzar, or Adobe Acrobats export feature to convert PDFs to formats like Word, Excel, JPEG, etc. Software like Adobe Acrobat, Microsoft Word, or other PDF editors may have options to export or save PDFs in different formats. **How do I password-protect a Dirichlet Student Problems 2014 Solutions PDF?** Most PDF editing software allows you to add password protection. In Adobe Acrobat, for instance, you can go to "File" -> "Properties" -> "Security" to set a password to restrict access or editing capabilities. Are there any free alternatives to Adobe Acrobat for working with PDFs? Yes, there are many free alternatives for working with PDFs, such as: LibreOffice: Offers PDF editing features. PDFsam: Allows splitting, merging, and editing PDFs. Foxit Reader: Provides basic PDF viewing and editing capabilities. How do I compress a PDF file? You can use online tools like Smallpdf, ILovePDF, or desktop software like Adobe Acrobat to compress PDF files without significant quality loss. Compression reduces the file size, making it easier to share and download. Can I fill out forms in a PDF file? Yes, most PDF viewers/editors like Adobe Acrobat, Preview (on Mac), or various online tools allow you to fill out forms in PDF files by selecting text fields and entering information. Are there any restrictions when working with PDFs? Some PDFs might have restrictions set by their creator, such as password protection,

editing restrictions, or print restrictions. Breaking these restrictions might require specific software or tools, which may or may not be legal depending on the circumstances and local laws.

Find Dirichlet Student Problems 2014 Solutions :

~~nba highlights ebook~~

remote jobs advanced

global trend black friday sale

~~step by step nfl schedule~~

~~advanced mortgage rates~~

mortgage rates step by step

nfl schedule ebook

award winning viral tiktok challenge

step by step nfl schedule

~~2025 edition chatgpt trending~~

2026 guide mortgage rates

tricks amazon deals

netflix top shows global trend

~~remote jobs for beginners~~

nfl schedule advanced

Dirichlet Student Problems 2014 Solutions :

The Ancient Secret of the Flower of Life, Vol. 1 Here, Drunvalo Melchizedek presents in text and graphics the first half of the Flower of Life workshop, illuminating the mysteries of how we came to be, ... The Ancient Secret of the Flower of Life: Volume 1 This book is out there. Drunvalo tells you everything, the secrets of the past and the future for only \$25 US. He describes in full detail what will happen when ... The Ancient Secret of the Flower of Life Volumes 1 & 2 Drunvalo Melchizedek's love for all life everywhere is immediately felt by anyone who meets him. For some time, he has been bringing his vast vision to the ... The ancient secret of the Flower of Life : an edited... Embrace the expanded vision and understanding that Drunvalo offers to the world. Coincidences abound, miracles flourish and the amazing stories of mysteries ... The Ancient Secret of the Flower of Life, Volume 1 Discover The Ancient Secret of the Flower of Life, Volume 1 by Drunvalo Melchizedek

and millions of other books available at Barnes & Noble. The Ancient Secret of the Flower of Life, Volume 1 Here Drunvalo Melchizedek presents in text and graphics the first half of the Flower of Life Workshop, illuminating the mysteries of how we came to be, why the ... The Ancient Secret of the Flower of Life Buy a cheap copy of The ancient secret of the flower of... book by Drunvalo Melchizedek. Once, all life in the universe knew the Flower of Life as the Volume 1 (Ancient Secret Of The Flower Of Life) - Drunvalo ... Here Drunvalo Melchizedek presents in text and graphics the first half of the Flower of Life Workshop, illuminating the mysteries of how we came to be, why the ... The Ancient Secret of the Flower of Life, Vol. 1 - Softcover The Ancient Secret of the Flower of Life, Vol. 1 by Drunvalo Melchizedek - ISBN 10: 1891824171 - ISBN 13: 9781891824173 - Light Technology Publishing - 1999 ... User manual Acer Aspire 1 (English - 79 pages) Manual. View the manual for the Acer Aspire 1 here, for free. This manual comes under the category laptops and has been rated by 7 people with an average of ... USER'S MANUAL The Quick Guide introduces you to the basic features and functions of your new computer. For more on how your computer can help you to be more productive, ... ACER ASPIRE ONE SERIES QUICK MANUAL Pdf Download View and Download Acer Aspire One Series quick manual online. Aspire One Series laptop ... Acer aspire one 722: user guide (1810 pages). User manual Acer Aspire One (English - 83 pages) Manual. View the manual for the Acer Aspire One here, for free. This manual comes under the category laptops and has been rated by 1 people with an average ... Aspire one Series The printed Aspire one Series User Guide contains useful information applying to all models in the Aspire one product series. It covers basic topics such as ... Acer Aspire ONE D255 User guide Nov 12, 2020 — Aspire one Series. User Guide. Book page image. Copyright © 2009. Acer Incorporated. All Rights Reserved. Aspire one Series User Guide ... Aspire All-in-one Computer User's Manual This guide contains detailed information on such subjects as system utilities, data recovery, expansion options and troubleshooting. In addition it contains ... Acer Aspire One User Manual Feb 11, 2023 — This user manual provides detailed instructions for the Acer Aspire One model, helping users get the most out of their device. Acer Aspire One Manual User Guide Model NAV50 ... - eBay For: Acer One Model NAV50. - Type: User's Guide, Quick guide and Passport. - Condition: New, Sealed. Free Acer Laptop User Manuals | ManualsOnline.com Acer Laptop 1300 series. Acer Aspire Notebook computer User's guide 1300 series. Pages: 96. See Prices ... Patterns for College Writing: A Rhetorical Reader and Guide Find step-by-step solutions and answers to Patterns for College Writing: A Rhetorical Reader and Guide - 9780312676841, as well as thousands of textbooks so ... Medium Length Important Questions & Answers from Patterns ... Patterns for College Writing Flashcards For students. Flashcards · Test · Learn · Solutions · Q-Chat: AI Tutor · Spaced Repetition · Modern Learning Lab · Quizlet Plus. For teachers. Live · Checkpoint ... Patterns for College Writing, 15th Edition Available for the first time with Achieve, Macmillan's new online learning platform, Patterns for College Writing is more flexible than ever. Patterns For College Writing Questions And Answers Introduce your thesis statement and briefly outline the main arguments you will present in the body of the essay. 6. Body paragraphs: Each body paragraph should ...

Patterns For College Writing Homework Help & Answers Patterns For College Writing Homework Help. Post Homework Questions and Get Answers from Verified Tutors 24/7. PATTERNS for College Writing ... responses to the various kinds of writing prompts in the book. Not only does this material introduce students to the book's features, but it also prepares ... Patterns for College Writing: A Rhetorical Reader and Guide In Patterns for College Writing, they provide students with exemplary rhetorical models and instructors with class-tested selections. The readings are a balance ... Patterns For College Writing 12th Edition Answers Pdf Page 1. Patterns For College Writing 12th Edition Answers Pdf. INTRODUCTION Patterns For College Writing 12th Edition Answers Pdf .pdf. Part One: The Writing Process - Patterns for College Writing Patterns for College Writing · 1. Reading to Write: Becoming a Critical Reader · 2. Invention · 3. Arrangement · 4. Drafting and Revising · 5. Editing and ...