

# Singular Riemannian Foliations with Sections \*

Marcos M. Alexandrino<sup>†</sup>

Departamento de Matemática,  
Pontifícia Universidade Católica,  
Rua Marquês de São Vicente, 225  
22453-900, Rio de Janeiro, Brazil.  
email: malex@mat.puc-rio.br

November 2003

## Abstract

A singular foliation on a complete riemannian manifold is said to be riemannian if every geodesic that is perpendicular at one point to a leaf remains perpendicular to every leaf it meets. In this paper we study singular riemannian foliations that have sections, i.e., totally geodesic complete immersed submanifolds that meet each leaf orthogonally and whose dimensions are the codimensions of the regular leaves.

We prove here that the restriction of the foliation to a slice of a leaf is diffeomorphic to an isoparametric foliation on an open set of an euclidian space. This result gives us local information about the singular foliation and in particular about the singular stratification of the foliation. It also allows us to describe the plaques of the foliation as level sets of a transnormal map (a generalisation of an isoparametric map). We also prove that the regular leaves of a singular riemannian foliation with sections are locally equifocal. We use this property to define a singular holonomy. Then we establish some results about this singular holonomy and illustrate them with a couple of examples.

---

\*2000 Mathematics Subject Classifications. 53C12, 57R30

Key words and phrases. Singular riemannian foliations, isoparametric maps, equifocal submanifolds, isoparametric submanifolds, singular holonomy.

<sup>†</sup>Supported by CNPq

# Riemannian Foliations Progreb In Mathematics S

**SB Merriam**



## **Riemannian Foliations Progreb In Mathematics S:**

**Riemannian Foliations** Molino, 2012-12-06 Foliation theory has its origins in the global analysis of solutions of ordinary differential equations on an  $n$  dimensional manifold  $M$  an autonomous differential equation is defined by a vector field  $X$  if this vector field has no singularities then its trajectories form a partition of  $M$  into curves i.e a foliation of codimension  $n-1$  More generally a foliation  $F$  of codimension  $q$  on  $M$  corresponds to a partition of  $M$  into immersed submanifolds the leaves of dimension  $p = n - q$  The first global image that comes to mind is that of a stack of plaques Viewed laterally transversally the leaves of such a stacking are the points of a quotient manifold  $W$  of dimension  $q$   $W \subset M$  Actually this image corresponds to an elementary type of foliation that one says is simple For an arbitrary foliation it is only locally on a simple open set  $U$  that the foliation appears as a stack of plaques and admits a local quotient manifold Globally a leaf  $L$  may return and cut a simple open set  $U$  in several plaques sometimes even an infinite number of plaques

**Riemannian Foliations** Pierre Molino, 1988 **On Minimal Riemannian Foliations** P. G. Walczak, 1981 *Geometric and Dynamical Properties of Riemannian Foliations* Hobum Kim, 1990 Given a Riemannian foliation  $\mathcal{F}$  on a Riemannian manifold  $M$  with a bundle like metric geometric and dynamical properties of geodesics orthogonal to the leaves of the foliation are studied In one line of work the concepts of  $\mathcal{F}$  Jacobi fields and  $\mathcal{F}$  Jacobi tensors are introduced Using these concepts an upper bound for the index of a focal point of a leaf is obtained when the orthogonal complement of the foliation is involutive In particular it is proved that there is no focal point of a leaf of a Riemannian foliation of codimension one Moreover it is also proved that if  $M$  is a complete Riemannian manifold of nonnegative sectional curvature and if the norm of the integrability tensor is small compared with the sectional curvature of  $M$  then  $\mathcal{F}$  is totally geodesic In another line of work it is proved that  $\mathcal{F}$  is harmonic if and only if the geodesic flow preserves the corresponding Riemannian volume form on the normal bundle corresponding to a Sasaki type metric in case  $\mathcal{F}$  is transversally flat 2 There is no Riemannian foliation on a compact Riemannian manifold of negative sectional curvature The proof uses Oseledec's multiplicative ergodic theorem

*Foliations* Alberto Candel, Lawrence Conlon, 2000 **Proofs of Conjectures about Singular Riemannian Foliations** Marcos M. Alexandrino, 2005 **On the Sobolev Inequality for Riemannian Foliations** Zhiqiang Sun, 2018 **Singular Riemannian Foliations with Sections, Transnormal Maps and Basic Forms** Marcos Martins Alexandrino, Cláudio Gorodski, 2006 *Rigidity Theorems for Riemannian Foliations of Spheres and Lie Groups* Dimitris George Pispinis, 1993

**Contributions to the Theory of Riemann Surfaces** Lars Valerian Ahlfors, E. Calabi, Marston Morse, Leo Sario, Donald Clayton Spencer, 1953-08-21 The description for this book Contributions to the Theory of Riemann Surfaces AM 30 Volume 30 will be forthcoming Foliations on Riemannian ... Rovenskii, 1998 *A Stability Theorem for Foliations with Singularities* A. Piatkowski, 1984 Riemannian Geometry and Holonomy Groups Simon Salamon, 1989 Advances in the Theory of Riemann Surfaces Lars Valerian Ahlfors, 1971-07-21 Intended for researchers in Riemann surfaces this volume summarizes a

significant portion of the work done in the field during the years 1966 to 1971      *The Riemann Legacy* Krzysztof Maurin, 2014-01-15      **Symmetric and Alternating Groups as Monodromy Groups of Riemann Surfaces I: Generic Covers and Covers with Many Branch Points** Robert M. Guralnick, John Shareshian, 2007 Considers indecomposable degree  $n$  covers of Riemann surfaces with monodromy group an alternating or symmetric group of degree  $d$  The authors show that if the cover has five or more branch points then the genus grows rapidly with  $n$  unless either  $d \mid n$  or the curves have genus zero there are precisely five branch points and  $n \leq d + 1$       *Singular riemannian foliations with sections and transnormal maps*, 2002 Um resultado clássico da teoria de grupos de Lie garante que as órbitas de um grupo de Lie compacto interceptam um toro máximo ortogonalmente Esta é um exemplo das chamadas ações polares As ações polares são ações de grupos compactos de isometrias que admitem seções subvariedades totalmente geodésicas que interceptam as órbitas ortogonalmente As ações polares e subvariedades isoparamétricas são casos particulares das chamadas folheações riemannianas singulares com este assunto que estudado nesta tese Além de apresentarmos resultados sobre essas folheações singulares apresentamos também resultados sobre as chamadas aplicações transnormais generalizações das aplicações isoparamétricas destacando como estes objetos estão relacionados      *Riemannian Geometry* Luther Pfahler Eisenhart, 1925      *One-dimensional Riemannian Foliations on the Heisenberg Group* Marius Ionut Munteanu, 2002      Riemannian Geometry L.P. Eisenhart, 1949

## Whispering the Strategies of Language: An Mental Journey through **Riemannian Foliations Progreb In Mathematics S**

In a digitally-driven world where monitors reign great and immediate interaction drowns out the subtleties of language, the profound techniques and mental subtleties concealed within words usually move unheard. However, set within the pages of **Riemannian Foliations Progreb In Mathematics S** a captivating literary treasure pulsing with organic feelings, lies an extraordinary quest waiting to be undertaken. Composed by a skilled wordsmith, this wonderful opus attracts readers on an introspective trip, softly unraveling the veiled truths and profound affect resonating within the material of every word. Within the emotional depths of the emotional evaluation, we can embark upon a honest exploration of the book is primary themes, dissect its interesting publishing style, and fail to the strong resonance it evokes strong within the recesses of readers hearts.

[https://pinsupreme.com/book/scholarship/index.jsp/paths\\_to\\_contemporary\\_french\\_literature.pdf](https://pinsupreme.com/book/scholarship/index.jsp/paths_to_contemporary_french_literature.pdf)

### **Table of Contents Riemannian Foliations Progreb In Mathematics S**

1. Understanding the eBook Riemannian Foliations Progreb In Mathematics S
  - The Rise of Digital Reading Riemannian Foliations Progreb In Mathematics S
  - Advantages of eBooks Over Traditional Books
2. Identifying Riemannian Foliations Progreb In Mathematics S
  - 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 Riemannian Foliations Progreb In Mathematics S
  - User-Friendly Interface
4. Exploring eBook Recommendations from Riemannian Foliations Progreb In Mathematics S
  - Personalized Recommendations
  - Riemannian Foliations Progreb In Mathematics S User Reviews and Ratings

- Riemannian Foliations Progreb In Mathematics S and Bestseller Lists
- 5. Accessing Riemannian Foliations Progreb In Mathematics S Free and Paid eBooks
  - Riemannian Foliations Progreb In Mathematics S Public Domain eBooks
  - Riemannian Foliations Progreb In Mathematics S eBook Subscription Services
  - Riemannian Foliations Progreb In Mathematics S Budget-Friendly Options
- 6. Navigating Riemannian Foliations Progreb In Mathematics S eBook Formats
  - ePub, PDF, MOBI, and More
  - Riemannian Foliations Progreb In Mathematics S Compatibility with Devices
  - Riemannian Foliations Progreb In Mathematics S Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Riemannian Foliations Progreb In Mathematics S
  - Highlighting and Note-Taking Riemannian Foliations Progreb In Mathematics S
  - Interactive Elements Riemannian Foliations Progreb In Mathematics S
- 8. Staying Engaged with Riemannian Foliations Progreb In Mathematics S
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Riemannian Foliations Progreb In Mathematics S
- 9. Balancing eBooks and Physical Books Riemannian Foliations Progreb In Mathematics S
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Riemannian Foliations Progreb In Mathematics S
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Riemannian Foliations Progreb In Mathematics S
  - Setting Reading Goals Riemannian Foliations Progreb In Mathematics S
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Riemannian Foliations Progreb In Mathematics S
  - Fact-Checking eBook Content of Riemannian Foliations Progreb In Mathematics S
  - 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

### **Riemannian Foliations Progreb In Mathematics S Introduction**

Free PDF Books and Manuals for Download: Unlocking Knowledge at Your Fingertips In todays fast-paced digital age, obtaining valuable knowledge has become easier than ever. Thanks to the internet, a vast array of books and manuals are now available for free download in PDF format. Whether you are a student, professional, or simply an avid reader, this treasure trove of downloadable resources offers a wealth of information, conveniently accessible anytime, anywhere. The advent of online libraries and platforms dedicated to sharing knowledge has revolutionized the way we consume information. No longer confined to physical libraries or bookstores, readers can now access an extensive collection of digital books and manuals with just a few clicks. These resources, available in PDF, Microsoft Word, and PowerPoint formats, cater to a wide range of interests, including literature, technology, science, history, and much more. One notable platform where you can explore and download free Riemannian Foliations Progreb In Mathematics S PDF books and manuals is the internets largest free library. Hosted online, this catalog compiles a vast assortment of documents, making it a veritable goldmine of knowledge. With its easy-to-use website interface and customizable PDF generator, this platform offers a user-friendly experience, allowing individuals to effortlessly navigate and access the information they seek. The availability of free PDF books and manuals on this platform demonstrates its commitment to democratizing education and empowering individuals with the tools needed to succeed in their chosen fields. It allows anyone, regardless of their background or financial limitations, to expand their horizons and gain insights from experts in various disciplines. One of the most significant advantages of downloading PDF books and manuals lies in their portability. Unlike physical copies, digital books can be stored and carried on a single device, such as a tablet or smartphone, saving valuable space and weight. This convenience makes it possible for readers to have their entire library at their fingertips, whether they are commuting, traveling, or simply enjoying a lazy afternoon at home. Additionally, digital files are easily searchable, enabling readers to locate specific information within seconds. With a few keystrokes, users can search for keywords, topics, or phrases, making research and finding relevant information a breeze. This efficiency saves time and effort, streamlining the learning process and allowing individuals to focus on extracting the information they need. Furthermore, the availability of free PDF books and manuals

fosters a culture of continuous learning. By removing financial barriers, more people can access educational resources and pursue lifelong learning, contributing to personal growth and professional development. This democratization of knowledge promotes intellectual curiosity and empowers individuals to become lifelong learners, promoting progress and innovation in various fields. It is worth noting that while accessing free Riemannian Foliations Progreb In Mathematics S PDF books and manuals is convenient and cost-effective, it is vital to respect copyright laws and intellectual property rights. Platforms offering free downloads often operate within legal boundaries, ensuring that the materials they provide are either in the public domain or authorized for distribution. By adhering to copyright laws, users can enjoy the benefits of free access to knowledge while supporting the authors and publishers who make these resources available. In conclusion, the availability of Riemannian Foliations Progreb In Mathematics S free PDF books and manuals for download has revolutionized the way we access and consume knowledge. With just a few clicks, individuals can explore a vast collection of resources across different disciplines, all free of charge. This accessibility empowers individuals to become lifelong learners, contributing to personal growth, professional development, and the advancement of society as a whole. So why not unlock a world of knowledge today? Start exploring the vast sea of free PDF books and manuals waiting to be discovered right at your fingertips.

### **FAQs About Riemannian Foliations Progreb In Mathematics S Books**

How do I know which eBook platform is the best for me? Finding the best eBook platform depends on your reading preferences and device compatibility. Research different platforms, read user reviews, and explore their features before making a choice. Are free eBooks of good quality? Yes, many reputable platforms offer high-quality free eBooks, including classics and public domain works. However, make sure to verify the source to ensure the eBook credibility. Can I read eBooks without an eReader? Absolutely! Most eBook platforms offer web-based readers or mobile apps that allow you to read eBooks on your computer, tablet, or smartphone. How do I avoid digital eye strain while reading eBooks? To prevent digital eye strain, take regular breaks, adjust the font size and background color, and ensure proper lighting while reading eBooks. What the advantage of interactive eBooks? Interactive eBooks incorporate multimedia elements, quizzes, and activities, enhancing the reader engagement and providing a more immersive learning experience. Riemannian Foliations Progreb In Mathematics S is one of the best book in our library for free trial. We provide copy of Riemannian Foliations Progreb In Mathematics S in digital format, so the resources that you find are reliable. There are also many Ebooks of related with Riemannian Foliations Progreb In Mathematics S. Where to download Riemannian Foliations Progreb In Mathematics S online for free? Are you looking for Riemannian Foliations Progreb In Mathematics S PDF? This is definitely going to save you time and cash in something you should think about.



## Find Riemannian Foliations Progreb In Mathematics S :

*paths to contemporary french literature*

*pavie mibion exploration work*

paul dickerson

pathology of adrenal and extra-adrenal paraganglia

patterns of culture

*patient care in neurology*

*pathways to faith the stories of 210 faithful people*

paul an outline of his theology

patrick henry practical revolutionary

pathology of the lung

**paul mccartney on the record**

~~paw pals~~

*patriot future a novel*

patterns of policing a comparative international analysis

**paul cezanne how he amazed the world**

## Riemannian Foliations Progreb In Mathematics S :

1955-1958 Handbook issued with each machine. Special instruction sheets are issued for ... E FOR THE HOWARD ROTAVATOR "YEOMAN". TENAE. DRKINGURS). LUTCH ADJUSTMENT (ALLOW. Howard Rotary Hoes Yeoman Rotavator Owner's & ... Howard Rotary Hoes Yeoman Rotavator Owner's & Attachments Handbook - (2 books) ; Vintage Manuals UK (4466) ; Approx. \$8.47 ; Item description from the sellerItem ... Manuals Manuals ; Howard 350 (circa 1967), Howard 350 Rotavator Parts List, View ; Howard Gem Series 2, Howard Gem with BJ Engine Operator Instructions, Maintenance & ... Howard Rotavator Yeoman Owners Handbook Howard Rotavator Yeoman Owners Handbook ; Howard Rotavator E Series Instuction Book (a) ; Howard Rotavator Smallford Rotaplanter Mk 2 Parts List (y). Free Rotavator, Cultivator, Tiller & Engine Manuals Old Rotavator, cultivator, tiller, engine manuals, spares lists, instructions for Briggs Stratton, Tehcumseh, Honda, Flymo, Howard, Merry Tiller etc. Historical Rotavators - Guy Machinery HOWARD ROTAVATOR BULLDOG OWNER'S MANUAL. TRACTOR-MOUNTED PRIMARY TILLAGE ... HOWARD ROTAVATOR YEOMAN INSTRUCTION BOOK. Howard Rotavator Yeoman Attachments Instructions ... Howard Rotavator Yeoman Attachments Instructions Factory Photcopy.

Brand: HOWARD Product Code: VEH907 Availability: 1 In Stock. Price: £13.60. Quantity:. Howard yeoman rotavator Jul 8, 2020 — Hi. New to the group and the world of vintage engines. I have recently acquired a Howard yeoman rotavator with a mk40 villiers engine ... Howard Yeoman Rotavator in Equipment Shed - Page 1 of 1 Apr 17, 2010 — Hi New to the forum and would welcome some information particularly operators manual for a Howard Yeoman rotavator with a BSA 420cc engine. Engine Types & Models Fitted to Howard Rotavator's Past ... Engine. Model. Briggs & Stratton (2½hp. Bullfinch. Briggs & Stratton (13hp). 2000 Tractor. Briggs & Stratton (4.3hp / 5hp). 350 / 352. BSA 120cc. Grade 6 FSA Mathematics Practice Test Questions The purpose of these practice test materials is to orient teachers and students to the types of questions on paper-based FSA Mathematics tests. By using. Grade 6 FSA ELA Reading Practice Test Questions The purpose of these practice test materials is to orient teachers and students to the types of questions on paper-based FSA ELA Reading tests. By using. Grade 6 FSA Mathematics Practice Test Answer Key The Grade 6 FSA Mathematics Practice Test Answer Key provides the correct response(s) for each item on the practice test. The practice questions and. 2019 FSA 6th Grade Review Practice Test 1 2019 FSA 6th Grade Review. Practice Test. 1. Page 2. 2019 FSA 6th Grade Review. Practice Test. 2. Page 3. 2019 FSA 6th Grade Review. Practice Test. FSA - Grade 6 Math: Test Prep & Practice Final Exam Test and improve your knowledge of FSA - Grade 6 Math: Test Prep & Practice with fun multiple choice exams you can take online with Study.com. Grade 6 Mathematics Questions. Yes. No. Is the proportion of the punch that is cranberry juice the same in each of Chris's recipes given in his table? Is the proportion of the. FSA - Grade 6 Math: Test Prep & Practice Course FSA Grade 6 Mathematics Exam Breakdown ; Expressions and Equations, 30%, 18-19 questions ; Geometry, 15%, 9-10 questions. Grade 6 FSA ELA Writing Practice Test The purpose of these practice test materials is to orient teachers and students to the types of passages and prompts on FSA ELA Writing tests. FAST Practice Test and Sample Questions - Florida ... FAST Practice Test & Sample Questions for Grades 3-8 and High School. Check out Lumos Florida State Assessment Practice resources for Grades 3 to 8 students! Creating Teams With... by Harvard Business School Press Part of: Harvard Business Essentials (12 books). Creating Teams With an Edge: The Complete Skill Set to Build Powerful and Influential Teams. Back. Creating Teams with an Edge (Harvard Business Essentials) This is a very solid guide from the folks at Harvard Business School Press that provides the basics of how to create, use, and manage teams. It opens with a ... Creating Teams With an Edge: The Complete Skill Set to ... Highlighting the latest research on team development and dynamics--and including hands-on tools for improving communication, resolving conflicts, promoting ... Creating Teams With an Edge (The Complete Skill Set ... This book title, Creating Teams With an Edge (The Complete Skill Set to Build Powerful and Influential Teams), ISBN: 9781591392903, by Harvard Business Review, ... Creating Teams with an Edge : The Complete Skill Set to Build ... Harvard Business Essentials: Creating Teams with an Edge : The Complete Skill Set to Build Powerful and Influential Teams (Paperback). USD\$14.75. You save ... Creating Teams With an Edge: The Complete Skill Set to ... Highlighting the latest research on team development and

dynamics--and including hands-on tools for improving communication, resolving conflicts, promoting ... Creating Teams With an Edge: The Complete Skill Set to ... Creating Teams With an Edge: The Complete Skill Set to Build Powerf... Paperback ; ISBN. 9781591392903 ; EAN. 9781591392903 ; Accurate description. 4.8 ; Reasonable ... Creating Teams with an Edge (Harvard Business Essentials) Creating Teams With an Edge: The Complete Skill Set to Build Powerful and Influential Teams. HB ESSENTIALS. Published by Harvard Business Review Press (2004). Pre-Owned Creating Teams with an Edge Pre-Owned Creating Teams with an Edge: The Complete Skill Set to Build Powerful and Influential Teams (Paperback) 159139290X 9781591392903 ; Book Format ... Creating Teams with an Edge: The Complete Skill Set to ... Creating Teams with an Edge: The Complete Skill Set to Build Powerful and: Used ; Item Number. 285014673631 ; Publication Date. 2004-03-31 ; Pages. 171 ; Accurate ...