Maths Memo Of Paper One March Grade Twelve 2014

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Activities for Exploring Mathematics, Second Edition American Mathematical Soc.
Click here to view the abstract. IntroductionProof of Theorem 1.1 in the caseProof of Theorem 1.1 in the caseAppendixBibliography
American Mathematical Soc.
This paper quantifies the speed of convergence and higher-order asymptotics of fast diffusion dynamics on Rn to the Barenblatt (self similar) solution. Degeneracies in the parabolicity of this equation are cured by re-expressing the dynamics on a manifold with a cylindrical end, called the cigar. The nonlinear evolution becomes differentiable in Hölder spaces on the cigar. The linearization of the dynamics is given by the Laplace-Beltrami operator plus a transport term (which can be suppressed by introducing appropriate weights into the function space norm), plus a finite-depth potential well with a universal profile. In the limiting case of the (linear) heat equation, the depth diverges, the number of eigenstates increases without bound, and the continuous spectrum recedes to infinity. The authors provide a detailed study of the linear and nonlinear problems in Hölder spaces on the cigar, including a sharp boundedness estimate for the semigroup, and use this as a tool to obtain sharp convergence results toward the Barenblatt solution, and higher order asymptotics. In finer convergence results (after modding out symmetries of the problem), a subtle interplay between convergence rates and tail behavior is revealed. The difficulties involved in choosing the right functional spaces in which to carry out the analysis can be interpreted as genuine features of the equation rather than mere annoying technicalities.
4th International Conference, MKM 2005, Bremen, Germany, July 15-17, 2005, Revised Selected Papers American Mathematical Soc.
This volume contains ten papers that have been collected by the Canadian Society for History and Philosophy of Mathematics/Société canadienne d'histoire et de philosophie des mathématiques. It showcases rigorously-reviewed contemporary scholarship on an interesting variety of topics in the history and philosophy of mathematics from the seventeenth century to the modern era. The volume begins with an exposition of the life and work of Professor Boles?aw Soboci?ski. It then moves on to cover a collection of topics about twentieth-century philosophy of mathematics, including Fred Sommers's creation of Traditional Formal Logic and Alexander Grothendieck's work as a starting point for discussing analogies between commutative algebra and algebraic geometry. Continuing the focus on the philosophy of mathematics, the next selections discuss the mathematization of biology and address the study of numerical cognition. The volume then moves to discussing various aspects of mathematics education, including Charles Davies's early book on the teaching of mathematics and the use of Gaussian Lemniscates in the classroom. A collection of papers on the history of mathematics in the nineteenth century closes out the volume, presenting a discussion of Gauss's "Allgemeine Theorie des Erdmagnetismus" and a comparison of the geometric works of Desargues and La Hire. Written by leading scholars in the field, these papers are accessible not only to mathematicians and students of the history and philosophy of mathematics, but also to anyone with a general interest in mathematics.
Philosophical Papers: Volume 1, Mathematics, Matter and Method American Mathematical Soc.
There exist results on the connection between the theory of wavelets and the theory of integral self-affine tiles and in particular, on the construction of wavelet bases using integral self-affine tiles. However, there are many non-integral self-affine tiles which can also yield wavelet basis. In this work, the author gives a complete characterization of all one and two dimensional -dilation scaling sets such that is a self-affine tile satisfying for some R , where is a integral expansive matrix with and .
American Mathematical Soc.
The authors prove the long time stability of KAM tori (thus quasi-periodic solutions) for nonlinear Schr ö dinger equation subject to Dirichlet boundary conditions , where is a real Fourier multiplier. More precisely, they show that, for a typical Fourier multiplier , any solution with the initial datum in the -neighborhood of a KAM torus still stays in the -neighborhood of the KAM torus for a polynomial long time such as for any given with , where is a constant depending on and as .
Understanding the Numbers American Mathematical Soc.
1981- in 2 v.: v.1, Subject index; v.2, Title index, Publisher/title index, Association name index, Acronym index, Key to publishers' and distributors' abbreviations.
Mathematical Knowledge Management American Mathematical Soc.
The author introduces a notion of hyperbolic groupoids, generalizing the notion of a Gromov hyperbolic group. Examples of hyperbolic groupoids include actions of Gromov hyperbolic groups on their boundaries, pseudogroups generated by expanding self-coverings, natural pseudogroups acting on leaves of stable (or unstable) foliation of an Anosov diffeomorphism, etc. The author describes a duality theory for hyperbolic groupoids. He shows that for every hyperbolic groupoid G there is a naturally defined dual groupoid G acting on the Gromov boundary of a Cayley graph of G. The groupoid G is also hyperbolic and such that (G) is equivalent to G. Several classes of examples of hyperbolic groupoids and their applications are discussed.
Associations' Publications in Print American Mathematical Soc.
A partial solution of the quaternionic contact Yamabe problem on the quaternionic sphere is given. It is shown that the torsion of the Biquard connection vanishes exactly when the trace-free part of the horizontal Ricci tensor of the Biquard connection is zero and this occurs precisely on 3-Sasakian manifolds. All conformal transformations sending the standard flat torsion-free quaternionic contact structure on the quaternionic Heisenberg group to a quaternionic contact structure with vanishing torsion of the Biquard connection are explicitly described. A "3-Hamiltonian form" of infinitesimal conformal automorphisms of quaternionic contact structures is presented.
American Mathematical Soc.
The author proves nonlinear stability of line soliton solutions of the KP-II equation with respect to transverse perturbations that are exponentially localized as . He finds that the amplitude of the line soliton converges to that of the line soliton at initial time whereas jumps of the local phase shift of the crest propagate in a finite speed toward . The local amplitude and the phase shift of the crest of the line solitons are described by a system of 1D wave equations with diffraction terms.
Symmetry Breaking for Representations of Rank One Orthogonal Groups American Mathematical Soc.
Spectral triples for nonunital algebras model locally compact spaces in noncommutative geometry. In the present text, the authors prove the local index formula for spectral triples over nonunital algebras, without the assumption of local units in our algebra. This formula has been successfully used to calculate index pairings in numerous noncommutative examples. The absence of any other effective method of investigating index problems in geometries that are genuinely noncommutative, particularly in the nonunital situation, was a primary motivation for this study and the authors illustrate this point with two examples in the text. In order to understand what is new in their approach in the commutative setting the authors prove an analogue of the Gromov-Lawson relative index formula (for Dirac type operators) for even dimensional manifolds with bounded geometry, without invoking compact supports. For odd dimensional manifolds their index formula appears to be completely new.
Springer Science & Business Media
This volume deals with the philosophy of mathematics and of science and the nature of philosophical and scientific enquiry.
The Optimal Version of Hua's Fundamental Theorem of Geometry of Rectangular Matrices American Mathematical Soc.
Statistics are just as vital to understanding political science as the study of institutions, but getting students to understand them when teaching a methods course can be a big challenge. In Statistics for Political Analysis, author Theresa Marchant-Shapiro makes understanding the numbers easy. The only introduction to statistics book written specifically for political science undergraduates, this book explains each statistical concept in plain language—from basic univariate statistics and the basic measures of association to bivariate and multivariate regression—and uses real world political examples. Students learn the relevance of statistics to political science, how to understand and calculate statistics mathematically, and how to obtain them using SPSS. All calculations are modeled step-by-step, giving students needed practice to master the process without making it intimidating. Each chapter concludes with exercises that get students actively applying the steps and building their professional skills through data calculation, analysis, and memo writing.
American Mathematical Soc.
Helping bring mathematics and engineering to life, these challenging lessons give teachers an exciting tool for engaging advanced learners through creativity and hands-on products. Units are driven by standards and invite students to become baseball field architects, create flying jellyfish, make a gnome hat parachute, scale skyscrapers, and more! Each project includes step-by-step lesson plans with reproducible templates, time estimates, and a materials list. While centered on STEAM (science, technology, engineering, arts, and mathematics) competencies, true to real-world experiences, these hands-on projects span the curriculum—including writing and public speaking—and while they suit entire classrooms and smaller groups, they can also be easily adapted to individual projects for independent study and home school.
Philosophical Papers: Volume 1, Mathematics, Matter and Method
Introduction Statement of the results Mixing time preliminaries Outline of the proof of Theorem 2.1 Random graph estimates Supercritical case Subcritical case Critical Case Fast mixing of the Swendsen-Wang process on trees Acknowledgements Bibliography
Critical Population and Error Threshold on the Sharp Peak Landscape for a Moran Model Springer
A stationary solution of the rotating Navier-Stokes equations with a boundary condition is called an Ekman boundary layer. This book constructs stationary solutions of the rotating Navier-Stokes-Boussinesq equations with stratification effects in the case when the rotating axis is not necessarily perpendicular to the horizon. The author calls such stationary solutions Ekman layers. This book shows the existence of a weak solution to an Ekman perturbed system, which satisfies the strong energy inequality. Moreover, the author discusses the uniqueness of weak solutions and computes the decay rate of weak solutions with respect to time under some assumptions on the Ekman layers and the physical parameters. The author also shows that there exists a unique global-in-time strong solution of the perturbed system when the initial datum is sufficiently small. Comparing a weak solution satisfying the strong energy inequality with the strong solution implies that the weak solution is smooth with respect to time when time is sufficiently large.
American Mathematical Soc.
The authors investigate the global continuity on spaces with of Fourier integral operators with smooth and rough amplitudes and/or phase functions subject to certain necessary non-degeneracy conditions. In this context they prove the optimal global boundedness result for Fourier integral operators with non-degenerate phase functions and the most general smooth H ö rmander class amplitudes i.e. those in with . They also prove the very first results concerning the continuity of smooth and rough Fourier integral operators on weighted spaces, with and (i.e. the Muckenhoupt weights) for operators with rough and smooth amplitudes and phase functions satisfying a suitable rank condition.
American Mathematical Soc.
This book puts forward a new role for mathematics in the natural sciences. In the traditional understanding, a strong viewpoint is advocated, on the one hand, according to which mathematics is used for truthfully expressing laws of nature and thus for rendering the rational structure of the world. In a weaker understanding, many deny that these fundamental laws are of an essentially mathematical character, and suggest that mathematics is merely a convenient tool for systematizing observational knowledge. The position developed in this volume combines features of both the strong and the weak viewpoint. In accordance with the former, mathematics is assigned an active and even shaping role in the sciences, but at the same time, employing mathematics as a tool is taken to be independent from the possible mathematical structure of the objects under consideration. Hence the tool perspective is contextual rather than ontological. Furthermore, tool-use has to respect conditions like suitability, efficacy, optimality, and others. There is a spectrum of means that will normally differ in how well they serve particular purposes. The tool perspective underlines the inevitably provisional validity of mathematics: any tool can be adjusted, improved, or lose its adequacy upon changing practical conditions.
Higher-Order Time Asymptotics of Fast Diffusion in Euclidean Space: A Dynamical Systems Approach American Mathematical Soc.
Let be the automorphic representation of generated by a full level cuspidal Siegel eigenform that is not a Saito-Kurokawa lift, and be an arbitrary cuspidal, automorphic representation of . Using Furusawa's integral representation for combined with a pullback formula involving the unitary group , the authors prove that the -functions are "nice". The converse theorem of Cogdell and Piatetski-Shapiro then implies that such representations have a functorial lifting to a cuspidal representation of . Combined with the exterior-square lifting of Kim, this also leads to a functorial lifting of to a cuspidal representation of . As an application, the authors obtain analytic properties of various -functions related to full level Siegel cusp forms. They also obtain special value results for and
Mathematics as a Tool CRC Press
In this monograph the authors introduce a new method to study bifurcations of KAM tori with fixed Diophantine frequency in parameter-dependent Hamiltonian systems. It is based on Singularity Theory of critical points of a real-valued function which the authors call the potential. The potential is constructed in such a way that: nondegenerate critical points of the potential correspond to twist invariant tori (i.e. with nondegenerate torsion) and degenerate critical points of the potential correspond to non-twist invariant tori. Hence, bifurcating points correspond to non-twist tori.
On Non-Topological Solutions of the A_{2} and B_{2} Chern-Simons System American Mathematical Soc.
This book constitutes the thoroughly refereed post-proceedings of the 4th

International Conference on Mathematical Knowledge Management, MKM 2005, held in Bremen, Germany in July 2005.The 26 revised full papers presented were carefully selected during two rounds of reviewing and improvement from 38 submissions. The papers in this volume cover the whole area of mathematical knowledge management. Topics range from foundations and the representational and document-structure aspects of mathematical knowledge, over process questions like authoring, migration, and consistency management by automated theorem proving to applications in e-learning and case studies.