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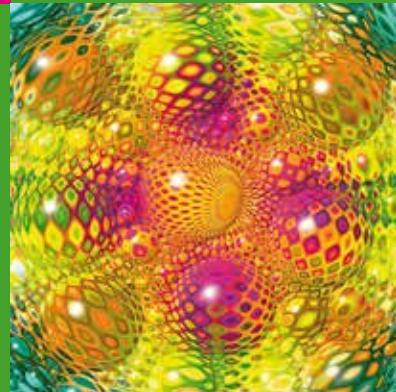
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Books series

For the convenience of the reader, this catalog is in English apart from the series titles and descriptions of the books written in French.

ASTÉRISQUE

Astérisque *is a book series of high level. It covers the whole field of mathematics. Apart from Bourbaki seminars, which survey very recent results that appeared elsewhere, it publishes original works and is aimed at specialists.* (ISSN 0303-1179)

Scientific Board: M.-C. Arnaud, C. Breuil, **N. Burq**, E. di Nezza, C. Guillarmou, A. Iozzi, E. Moulines, A. Oancea, N. Ressayre, R. Rhodes, S. Serfaty, S. Woo Shin.

Vol. 446
Séminaire Bourbaki, volume 2022-2023, exposés 1197-1210

ISBN 978-2-85629-984-5
2023 - 520 pages - Softcover. 17 x 24
Public: 81 € - Members: 57 €

Ce 74ᵉ volume du Séminaire Bourbaki contient les textes des quatorze exposés présentés pendant l'année 2022/2023 : conjecture des dénominateurs non bornés, validité de la théorie cinétique des gaz, théorie ergodique ponctuelle, théorème de Lang-Weil tordu, conjecture du facteur direct, permutations aléatoires et graphes de Ramanujan, algèbres de von Neumann et corrélations quantiques, structure du groupe des homéomorphismes de la sphère de dimension 2, convergence ponctuelle pour l'équation de Schrödinger, croissance exponentielle dans les groupes hyperboliques, axiomes de forcing forts et hypothèse du continu, non-unicité des solutions de Leray de l'équation de Navier-Stokes, catégories tensorielles en caractéristique positive, invariance par rotation pour la percolation planaire.

Vol. 445
The Connes character formula for locally compact spectral triples
F. SUKOCHEV & D. ZANIN

ISBN 978-2-85629-982-1
2023 - 150 pages - Softcover. 17 x 24
Public: 43 € - Members: 31 €

A fundamental tool in noncommutative geometry is Connes' character formula. This formula is used in an essential way in the applications of noncommutative geometry to index theory and to the spectral characterisation of manifolds. A non-compact space is modeled in noncommutative geometry by a non-unital spectral triple. Our aim is to establish the Connes character formula for non-unital spectral triples. This is significantly more difficult than in the unital case and we achieve it with the use of recently developed double operator integration techniques. Previously, only partial extensions of Connes' character formula to the non-unital case were known. In the course of the proof, we establish two more results of importance in noncommutative geometry: an asymptotic for the heat semigroup of a non-unital spectral triple, and the analyticity of the associated ζ-function. We require certain assumptions on the underlying spectral triple, and we verify these assumptions in the case of spectral triples associated to arbitrary complete Riemannian manifolds and also in the case of Moyal planes.
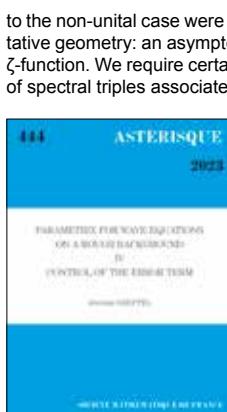
Vol. 444
Parametrix for wave equations on a rough background IV: Control of the error term
Jérémie SZEFTEL

ISBN 978-2-85629-978-4
2023 - 314 pages - Softcover. 17 x 24
Public: 60 € - Members: 42 €

This volume follows the issue n°443. The reader should refer to the abstract of this previous one.

Vol. 443

Parametrix for wave equations on a rough background I: Regularity of the phase at initial time. II: Construction and control at initial time

Jérémie SZEFTEL

This book is dedicated to the construction and the control of a parametrix to the homogeneous wave equation $\Box_g\phi=0$, where g is a rough metric satisfying the Einstein vacuum equations. Controlling such a parametrix as well as its error term when one only assumes L^2 bounds on the curvature tensor R of g is a major step of the proof of the bounded L^2 curvature conjecture, the latter being solved solved jointly with S. Klainerman and I. Rodnianski. On a more general level, this book deals with the control of the eikonal equation on a rough background, and with the derivation of L^2 bounds for Fourier integral operators on manifolds with rough phases and symbols, and as such is also of independent interest.

Vol. 442

Elliptic theory in domains with boundaries of mixed dimension

G. DAVID, J. FENEUIL, S. MAYBORODA

We study the initial regularity results (Hölder continuity, De Giorgi-Nash-Moser inequalities, maximum principle, existence and doubling property for the elliptic measure, and estimates for the Green function) for a class of second order elliptic operators associated to the geometry of a domain, whose boundary can have pieces of different dimensions, but where we have two related doubling measures, one on the domain and one on the boundary.

Vol. 441

Brownian structure in the KPZ fixed point

J. CALVERT, A. HAMMOND and M. HEGDE

Many models of one-dimensional local random growth are expected to lie in the Kardar-Parisi-Zhang (KPZ) universality class. For such a model, the interface profile in the long time limit is expected - and proved for a few integrable models - to be, when viewed in appropriately scaled coordinates, up to a parabolic shift, the $Airy_2$ process $A:R \to R$. This process may be embedded via the Robinson-Schensted-Knuth correspondence as the uppermost curve in an N-indexed system of random continuous curves, the Airy line ensemble. Among our principal results is the assertion that the $Airy_2$ process enjoys a very strong similarity to Brownian motion (of rate two) on unit-order intervals. This result yields bounds on the $Airy_2$ probabilities of a large class of events from the counterpart bounds on Brownian motion probabilities. The result has the consequence that the Radon-Nikodym derivative of the law of A on say [-1,1] after a suitable vertical shift, with respect to the law of Brownian motion on the same interval, has every polynomial moment finite. In fact, the quantitative comparison of probability bounds we prove also holds for the scaled energy profile with Dirac delta initial condition of the model of Brownian last passage percolation, a model that lies in the KPZ universality class and in which the energy of paths in a random Brownian environment is maximised. Our technique of proof harnesses a probabilistic resampling or *Brownian Gibbs* property satisfied by the Airy line ensemble after parabolic shift, and this article develops Brownian Gibbs analysis of this ensemble begun in work of Corwin and Hammond (2014) and pursued by Hammond (2019). Our Brownian comparison for scaled interface profiles is an element in the ongoing programme of studying KPZ universality via probabilistic and geometric methods of proof, aided by limited but essential use of integrable inputs. We also present and prove several applications, concerning for example the structure of near ground states in Brownian last passage percolation, or Brownian structure in scaled interface profiles that arise from the evolution from any element in a very general class of initial data.

Vol. 440

Sheaves and symplectic geometry of cotangent bundles

S. GUILLERMOU

ISBN 978-2-85629-972-2
2023 - 274 pages - Softcover. 17 x 24
Public: 54 € - Members: 38 €

We recall several results of the microlocal theory of sheaves of Kashiwara-Schapira and apply them to the study of the symplectic geometry of cotangent bundles. We explain how we can recover the Gromov nonsqueezing theorem, the Gromov-Eliashberg rigidity theorem, the existence of graph selectors; we prove a three cusps conjecture about curves on the sphere and we recover more recent results on the topology of compact exact Lagrangian submanifolds of cotangent bundles.

Vol. 439

A mod p Jacquet-Langlands relation and Serre filtration via the geometry of Hilbert modular varieties: Splicing and dicing

F. DIAMOND, P. KASSAEI, S. SASAKI

ISBN 978-2-85629-969-2
2023 - 111 pages - Softcover. 17 x 24
Public: 38 € - Members: 27 €

We consider Hilbert modular varieties in characteristic p with Iwahori level at p and construct a geometric Jacquet-Langlands relation showing that the irreducible components are isomorphic to products of projective bundles over quaternionic Shimura varieties of level prime to p. We use this to establish a relation between mod p Hilbert and quaternionic modular forms that reflects the representation theory of GL_2 in characteristic p and generalizes a result of Serre for classical modular forms. Finally we study the fibers of the degeneracy map to level prime to p and prove a cohomological vanishing result that is used to associate Galois representations to mod p Hilbert modular forms.
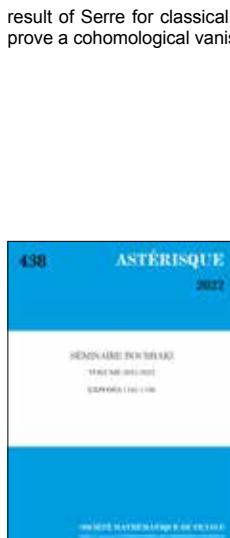
Vol. 438

Séminaire Bourbaki, volume 2021-2022, exposés 1181-1196

ISBN 978-85629-968-5
2022 - 598 pages - Softcover. 17 x 24
Public: 81 € - Members: 57 €

Ce 73e volume du Séminaire Bourbaki contient les textes des seize exposés présentés pendant l'année 2021/2022 : groupes de surface dans les réseaux des groupes de Lie, non-densité des points entiers et variations de structures de Hodge, flots de Ricci et difféomorphismes de variétés de dimension 3, structure des espaces limites des variétés non effondrées, classification des couplages invariants, conjecture de Shelah et théorème de Johnson, graphes expanseurs en dimension supérieure, trous spectraux non linéaires et applications, rigidité locale du spectre des longueurs marquées, problème de sous-convexité pour les fonctions L, équation de Schrödinger non linéaire, conjecture de Kannan-Lovász-Simonovits, problèmes additifs binaires pour les polynômes sur les corps finis, mesures cristallines, conjecture du K(π,1) pour les groupes d'Artin affines, ensembles sans progression arithmétique de longueur trois.

Vol. 437
Coloured stochastic vertex models and their spectral theory
A. Borodin, M. Wheeler

ISBN 978-2-85629-963-0
2022 - 225 pages - Softcover. 17 x 24
Public: 49 € - Members: 34 €

This work is is dedicated to sl_{n+1}-related integrable stochastic vertex models; we call such models coloured. We prove several results about these models, which include the following:

1. We construct the basis of (rational) eigenfunctions of the coloured transfer-matrices as partition functions of our lattice models with certain boundary conditions. Similarly, we construct a dual basis and prove the corresponding orthogonality relations and Plancherel formulae.
2. We derive a variety of combinatorial properties of those eigenfunctions, such as branching rules, exchange relations under Hecke divided-difference operators, (skew) Cauchy identities of different types, and monomial expansions.
3.We show that our eigenfunctions are certain (non-obvious) reductions of the nested Bethe Ansatz eigenfunctions.
4. For models in a quadrant with domain-wall (or half-Bernoulli) boundary conditions, we prove a matching relation that identifies the distribution of the coloured height function at a point with the distribution of the height function along a line in an associated colour-blind (sl_2-related) stochastic vertex model. Thanks to a variety of known results about asymptotics of height functions of the colour-blind models, this implies a similar variety of limit theorems for the coloured height function of our models.
5. We demonstrate how the coloured/uncoloured match degenerates to the coloured (or multi-species) versions of the ASEP, q-PushTASEP, and the q-boson model.
6. We show how our eigenfunctions relate to non-symmetric Cherednik-Macdonald theory, and we make use of this connection to prove a probabilistic matching result by applying Cherednik--Dunkl operators to the corresponding non-symmetric Cauchy identity.

Vol. 436
The Yang-Mills heat flow and the caloric gauge
S.-J. Oh, D. Tataru

ISBN 978-2-85629-961-6
2022 - 132 pages - Softcover. 17 x 24
Public: 38 € - Members: 27 €

This is the first part of the four-paper sequence, which establishes the Threshold Conjecture and the Soliton Bubbling vs Scattering Dichotomy for the hyperbolic Yang-Mills equation in the (4 + 1)-dimensional Minkowski space-time.
The primary subject of this paper, however, is another PDE, namely the energy critical Yang-Mills heat flow on the 4-dimensional Euclidean space. Our first goal is to establish sharp criteria for global existence and asymptotic convergence to a flat connection for this system, including the Dichotomy Theorem and the Threshold Theorem.
Our second goal is to use the Yang-Mills heat flow in order to define the caloric gauge, which will play a major role in the analysis of the hyperbolic Yang-Mills equation in the subsequent papers.

Vol. 435
Parabolic Hecke eigensheaves
R. Donagi, T. Pantev

ISBN 978-2-85629-960-9
2022 - 192 pages - Softcover. 17 x 24
Public: 50 € - Members: 35 €

We study the Geometric Langlands Conjecture (GLC) for rank two flat bundles on the projective line C with tame ramification at five points p_1, p_2, p_3, p_4, p_5.
In particular we construct the automorphic D-modules predicted by GLC on the moduli space of rank two parabolic bundles on $(C, \{p_1, p_2, p_3, p_4, p_5\})$.
The construction uses non-abelian Hodge theory and a Fourier-Mukai transform along the fibers of the Hitchin fibration to reduce the problem to one in classical projective geometry on the intersection of two quadrics in P^4.

Vol. 434
Heegner points, stark-Heegner points, and diagonal classes
M. Bertolini, H. Darmon, V. Rotger, M. A. Seveso, R. Venerucci

ISBN 978-2-85629-959-3
2022 - 228 pages - Softcover. 17 x 24
Public: 49 € - Members: 34 €

This volume comprises four interrelated articles whose unifying theme is the study of Heegner and Stark-Heegner points, and their connections with the padic logarithm of certain global cohomology classes attached to a pair of weight one theta series of a common (imaginary or real) quadratic field. These global classes are obtained from p-adic deformations of diagonal classes attached to triples of modular forms of weight > 1, and naturally generalise a construction of Kato which one recovers when the two theta series are replaced by Eisenstein series of weight one. Understanding the extent to which such classes obtained via the p-adic interpolation of motivic cohomology classes are themselves motivic is a key motivation for this study. A second is the desire to show that Stark-Heegner points, whose global nature is still poorly understood theoretically, arise from classes in global Galois cohomology.

Vol. 433
Triangulated categories of logarithmic motives over a field
F. Binda, D. Park, P. A. Ostvaer

ISBN 978-2-85629-957-9
2022 - 280 pages - Softcover. 17 x 24
Public: 55 € - Members: 39 €

In this work we develop a theory of motives for logarithmic schemes over fields in the sense of Fontaine, Illusie, and Kato. Our construction is based on the notion of finite log correspondences, the dividing Nisnevich topology on log schemes, and the basic idea of parameterizing homotopies by $\overline{\square}$, i.e. the projective line with respect to its compactifying logarithmic structure at infinity. We show that Hodge cohomology of log schemes is a $\overline{\square}$-invariant theory that is representable in the category of logarithmic motives. Our category is closely related to Voevodsky's category of motives and A^1-invariant theories: assuming resolution of singularities, we identify the latter with the full subcategory comprised of A^1-local objects in the category of logarithmic motives. Fundamental properties such as $\overline{\square}$-homotopy invariance, Mayer-Vietoris for coverings, the analogs of the Gysin sequence and the Thom space isomorphism as well as a blow-up formula and a projective bundle formula witness the robustness of the setup.
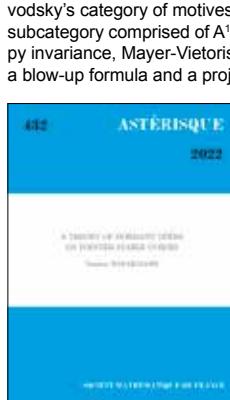
Vol. 432
A theory of dormant opers on pointed stable curves
Y. Wakabayashi

ISBN 978-2-85629-956-2
2022 - 296 pages - Softcover. 17 x 24
Public: 60 € - Members: 42 €

This manuscript presents a detailed and original account of the theory of opers defined on pointed stable curves in arbitrary characteristic and their moduli. In particular, it includes the development of the study of dormant opers, which are opers of a certain sort in positive characteristic. Our goal is to give an explicit formula, conjectured by Joshi, for the generic number of dormant opers.

Vol. 431
Geometric local ε-factors
Q. Quignard

ISBN 978-2-85629-953-1
2022 - 137 pages - Softcover. 17 x 24
Public: 43 € - Members: 30 €

Inspired by the work of Laumon on local ε-factors and by Deligne's 1974 letter to Serre, we give an explicit cohomological definition of ε-factors for ℓ-adic Galois representations over henselian discrete valuation fields of positive equicharacteristic p≠ℓ, with (not necessarily finite) perfect residue fields. These geometric local ε-factors are completely characterized by an explicit list of purely local properties, such as an induction formula and the compatibility with geometric class field theory in rank 1, and satisfy a product formula for ℓ-adic sheaves on a curve over a perfect field of characteristic p.

ASTÉRISQUE

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Scientific Board: B. Adamczewski, C. Bachoc, F. Charles, **F. Dahmani**, B. De Tilière, C. Fermanian, D. Frey, W. Lowen, E. Viehmann.

Vol. 179
Ellipsitomic associators
D. Calaque, M. Gonzalez

ISBN 979-8-85629-981-4
2023 - 96 pages - Softcover. 17 x 24
Public: 38 € - Members: 27 €

We develop a notion of ellipsitomic associators by means of operad theory. We take this opportunity to review the operadic point-of-view on Drinfeld associators and to provide such an operadic approach for elliptic associators too. We then show that ellipsitomic associators do exist, using the monodromy of the universal ellipsitomic KZB connection, that we introduced in a previous work. We finally relate the KZB ellipsitomic associators to certain Eisenstein series associated with congruence subgroups of $SL_2(Z)$, and to twisted elliptic multiple zeta values.

Vol. 178
Sur les ensembles de rotation des homéomorphismes de surface en genre ≥ 2
G. Lellouch

ISBN 978-2-85629-979-1
2023 - 121 pages - Softcover. 17 x 24
Public: 38 € - Members: 27 €

Ce mémoire étudie les homéomorphismes sur des surfaces de genre supérieur ou égal à 2 ayant un « gros » ensemble de rotation. À l'aide de la théorie de forçage de Le Calvez et Tal, reposant sur la construction d'un feuilletage transverse et l'étude des trajectoires de points re-latives à ce feuilletage, nous menons une étude globale sur les cycles asymptotiques de points dont les trajectoires globales ont des directions homologiques qui s'intersectent. Cette étude aboutit à la généralisation d'un certain nombre de résultats connu.

Vol. 177
Projections, multipliers and decomposable maps on noncommutative L^p-spaces
C. Arhancet, C. Kriegler

ISBN 978-2-85629-971-5
2023 - 186 pages - Softcover. 17 x 24
Public: 43 € - Members: 30 €

We introduce a noncommutative analogue of the absolute value of a regular operator acting on a noncommutative L^p-space. We equally prove that two classical operator norms, the regular norm and the decomposable norm are identical. We also describe precisely the regular norm of several classes of regular multipliers. This includes Schur multipliers and Fourier multipliers on some unimodular locally compact groups which can be approximated by discrete groups in various senses. A main ingredient is to show the existence of a bounded projection from the space of completely bounded L^p operators onto the subspace of Schur or Fourier multipliers, preserving complete positivity. On the other hand, we show the existence of bounded Fourier multipliers which cannot be approximated by regular operators, on large classes of locally compact groups, including all infinite abelian locally compact groups. We finish by introducing a general procedure for proving positive results on selfadjoint contractively decomposable Fourier multipliers, beyond the amenable case.

Vol. 176
Nouveaux théorèmes d'isogénie
E. Gaudron et G. Rémond

Étant donné une extension de type fini K du corps des nombres rationnels et une variété abélienne C sur K, nous considérons la classe de toutes les variétés abéliennes sur K isogènes (sur K) à une sous-variété abélienne d'une puissance de C. Nous expliquons comment définir, dans cette classe et de manière naturelle, une variété abélienne C^b dont l'anneau des endomorphismes contrôle toutes les isogénies entre éléments de la classe, au sens suivant : si d désigne le discriminant de l'anneau des endomorphismes de C^b alors, pour tout couple de variétés abéliennes isogènes dans la classe, il existe une isogénie entre elles dont le noyau est d'exposant au plus d. En outre, nous montrons que ce nombre d permet de majorer plusieurs invariants attachés à un élément quelconque A de la classe, comme le plus petit degré d'une polarisation sur A, le discriminant de son anneau d'endomorphismes ou le cardinal de la partie invariante sous Galois du groupe de Brauer géométrique de A. Lorsque K est un corps de nombres, le théorème des périodes appliqué à C^b et à sa période canonique fournit une borne explicite pour d en termes du degré de K, de la dimension de C^b et de la hauteur de Faltings de C. Nous en déduisons donc des majorations explicites des quantités mentionnées ci-dessus pour les isogénies, polarisations, endomorphismes et groupes de Brauer, qui améliorent considérablement les résultats antérieurs.

Vol. 175
On the pro-p Iwahori Hecke Ext-algebra of $SL_2(Q_p)$
P. Schneider, R. Ollivier

Let $G=SL_2(F)$ where F is a finite extension of Q_p. We suppose that the pro-p Iwahori subgroup I of G is a Poincaré group of dimension d. Let k be a field containing the residue field of F In this article, we study the graded Ext-algebra $E^*=Ext^*_{Mod(G)}(k[G/I],k[G/I])$. Its degree zero piece E^0 is the usual pro-p Iwahori-Hecke k-algebra H. We study E^d as an H-bimodule and deduce that for an irreducible admissible smooth k-representation V of G, we have $H^d(I,V)=0$ unless V is the trivial representation. When F=Qp with p≥5, we have d=3. In that case we describe E^* as an H-bimodule and give the structure as an algebra of the centralizer in E^* of the center of H. We deduce results on the values of the functor $H^*(I,-)$ which attaches to a (finite length) smooth k-representation V of G its cohomology with respect to I. We prove that $H^*(I,V)$ is always finite dimensional. Furthermore, if V is irreducible, then V is supersingular if and only if $H^*(I,V)$ is a supersingular H-module.

Vol. 174
Constructive and destructive interferences in nonlinear hyperbolic equations
R. Carles, C. Cheverry

This article introduces a physically realistic model for explaining how electromagnetic waves can be internally generated, propagate and interact in strongly magnetized plasmas or in nuclear magnetic resonance experiments. It studies high frequency solutions of nonlinear hyperbolic equations for time scales at which dispersive and nonlinear effects can be present in the leading term of the solutions. It explains how the produced waves can accumulate during long times to produce constructive and destructive interferences which, in the above contexts, are part of turbulent effects.

Vol. 173
On mod p local-global compatibility for GLn(Qp) in the ordinary case
C. Park, Z. Qian

Let p be a prime number, $n>2$ an integer, and F a CM field in which p splits completely. Assume that a continuous automorphic Galois representation $\bar{r} : Gal(\overline{Q}/F) \rightarrow GL_n(\overline{F}_p)$ is up-per-triangular and satisfies certain genericity conditions at a place w above p, and that every subquotient of $\bar{r}|_{Gal(\overline{Q}p/Fw)}$ of dimension >2 is Fontaine-Laffaille generic. In this paper, we show that the isomorphism class of $\bar{r}|_{Gal(\overline{Q}p/Fw)}$ is determined by $GLn(F_w)$-action on a space of mod p algebraic automorphic forms cut out by the maximal ideal of a Hecke algebra associated to $\bar{r}$. In particular, we show that the wildly ramified part of $\bar{r}|_{Gal(\overline{Q}p/Fw)}$ is determined by the action of Jacobi sum operators (seen as elements of $Fp[GL_n(F_p)])$ on this space.

Vol. 172
Asymptotic properties of small data solutions of the Vlasov-Maxwell system in high dimensions
L. Bigorgne

We prove almost sharp decay estimates for the small data solutions and their derivatives of the Vlasov-Maxwell system in dimension n≥4. The smallness assumption concerns only certain weighted L^1 or L^2 norms of the initial data. In particular, no compact support as-sumption is required on the Vlasov or the Maxwell fields. The main ingredients of the proof are vector field methods for both the kinetic and the wave equations, null properties of the Vlasov-Maxwell system to control high velocities and a new decay estimate for the velocity average of the solution of the relativistic massive transport equation. We also consider the massless Vlasov-Maxwell system under a lower bound on the velocity support of the Vlasov field. As we prove in this paper, the velocity support of the Vlasov field needs to be initially bounded away from 0. We compensate the weaker decay estimate on the velocity average of the massless Vlasov field near the light cone by an extra null decomposition of the velocity vector.

Vol. 171
On the evolution by duality of domains on manifolds
K. Coulibaly-Pasquier, L. Miclo

On a manifold, consider an elliptic diffusion X admitting an invariant measure μ. The goal of this paper is to introduce and investigate the first properties of stochastic domain evo-lutions $(D_t)_{t\in[0,\tau]}$ which are intertwining dual processes for X (where τ is an appropriate positive stopping time before the potential emergence of singularities). They provide an extension of Pitman's theorem, as it turns out that $(\mu(D_t))_{t\in[0,\tau]}$ is a Bessel-3 process, up to a natural time-change. When X is a Brownian motion on a Riemannian manifold, the dual domain-valued process is a stochastic modification of the mean curvature flow to which is added an isoperimetric ratio drift to prevent it from collapsing into singletons.

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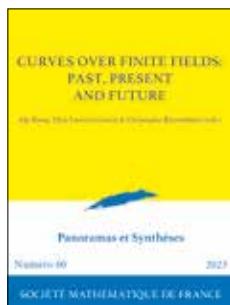
Vol. 60

Curves over finite fields : past, present and future

A. BASSA, E. LORENZO GARCIA & C. RITZENTHALER (eds.)
ISBN 978-2-85629-980-7
2023 - 192 pages - Softcover. 17 x 24
Public: 43 € - Members: 30 €

The present proceedings rely on the plenary lectures that were given during the online conference "Curves over finite fields: past, present and future" in May 2021. Each lecturer was asked to do a survey on a particular aspect of this research area and to point out some compelling open questions. The six lectures gathered here show the richness and diversity of the results in the domain: isogeny classes of abelian varieties, large automorphism groups, recursive towers, error-correcting codes, moduli spaces, arithmetic statistics are so many gates to this vivid area of research.
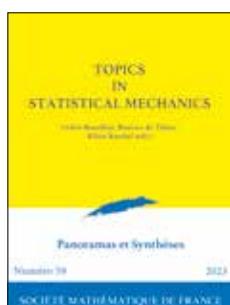
Vol. 59

Topics in statistical mechanics

C. BOUTILLIER, B. DE TILIÈRe, K. RASCHEL (eds.)
ISBN 978-2-85629-970-8
2023 - 230 pages - Softcover. 17 x 24
Public: 54 € - Members: 38 €

This volume aims at giving an overview of the "États de la recherche on Statistical Mechanics", organized by the French Mathematical Society in 2018, which took place in Institut Henri Poincaré (Paris) in 2018. It was a successful event bringing together 125 mathematicians, ranging from master students to young and confirmed researchers. There were four mini-courses by Francesco Caravenna, Hugo Duminil-Copin, Thierry Bodineau & Isabelle Gallagher & Laure Saint-Raymond, Vincent Vargas. This was complemented by thirteen research talks, altogether giving an overview of a wide number of models of statistical mechanics such as the Ising model, Potts model, percolation, perfect gases, Coulomb gases, particle systems, kinetically constrained spin models, the dimer model etc. This volume contains an introduction with a summary of the four mini-courses and of all the talks. The heart of this publication consists of five original contributions by: Djalil Chafaï, Ewain Gwynne & Nina Holden & Xin Sun, Arnaud Le Ny, Sébastien Ott & Yvan Velenik, Rémi Rhodes & Vincent Vargas.
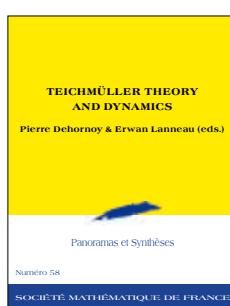
Vol. 58

Teichmüller theory and dynamics

P. DEHORNOY & E. LANNEAU (eds.)
ISBN 978-2-85629-966-1
2022 - 162 pages - Softcover. 17 x 24
Public: 43 € - Members: 30 €

This edition of *Panoramas & Synthèses* follows the 27th edition of the summer School in mathematics, focussed on *Teichmüller dynamics, mapping class groups and applications*. It took place from 11 to 22 June 2018 at the Institut Fourier (UMR CNRS 5582) of Grenoble. During this school, twelve specialists came to present the basics of the theory of translation surfaces and their moduli spaces, as well as the recent advances in the field. This volume brings together four texts, all based on the lecture notes of the school, and illustrates the interaction between Teichmüller theory and dynamics.

Vol. 57
Topics in statistical learning theory
P. L. BARTLETT, S. DASGUPTA
(edited by S. BOUCHERON & N. VAYATIS)

ISBN 978-2-85629-964-7
2022 - 89 pages - Softcover. 17 x 24
Public: 38 € - Members: 27 €

This volume is the outcome of a series of three lectures on statistical learning theory given at Institut Henri Poincaré in 2011 under the auspices of the Société Mathématique de France. The introductory chapter provides an overview of the history of Statistical Learning Theory, its roots, its mathematical tools and the questions that make it. The chapter "Algorithms for minimally supervised learning" by Sanjoy Dasgupta describes the progress of theoretical computer science on the issues of unsupervised learning (clustering) and active learning. Surprisingly, much of this progress is due to the confrontation of measurement concentration theory, complexity theory and established practices in numerical statistics. The chapter "Online prediction" by Peter Bartlett focuses on online learning. It is a confrontation between statistics, game theory and optimization.
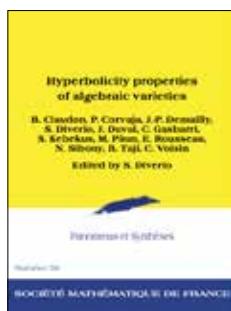
Vol. 56
Hyperbolicity properties of algebraic varieties
B. CLAUDON, P. CORVAJA, J.-P. DEMAILLY, S. DIVERIO, J. DUVAL, C. GASBARRI, S. KEBEKUS, M. PAUN, E. ROUSSEAU, N. SIBONY, B. TAJI, C. VOISIN
(edited by S. DIVERIO)

ISBN 978-2-85629-951-7
2021 - 388 pages - Softcover. 17 x 24
Public: 60 € - Members: 42 €

Since its introduction in the 70's, the notion of Kobayashi hyperbolicity has attracted a lot of attention in the mathematical community. Besides its aspects belonging to the several complex variables world, a fascinating theme is that of its interactions with the algebraic, arithmetic, and differential geometric properties of algebraic varieties. These interactions are essentially what this book is about and the issues addressed are: distribution and distribution of values of entire curves, algebraic analogues of hyperbolicity, hyperbolicity properties of projective hypersurfaces and of varieties of general type, hyperbolicity of moduli spaces, relationships between hyperbolicity and negative curvature, distribution of rational points on hyperbolic (arithmetic) varieties, and interplay of natural fibrations on algebraic varieties and hyperbolicity. The volume makes a point of the state of the art and tries to keep the language friendly enough to encourage PhD students as well as researchers in complex geometry to get into the study of hyperbolicity properties of algebraic varieties.
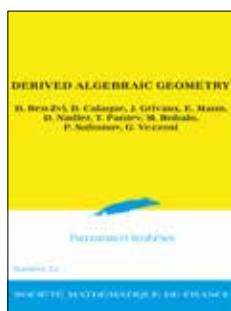
Vol. 55
Derived algebraic theory
D. BEN-ZVI, D. CALAQUE, J. GRIVAUX, É. MANN, D. NADLER, T. PANTEV, M. ROBALO, P. SAFRONOV, G. VEZZOSI

ISBN 978-2-85629-938-8
2021 - 230 pages - Softcover. 17 x 24
Public: 45 € - Members: 32 €

We give a quick introduction to derived algebraic geometry (DAG) sampling basic constructions and techniques. We discuss affine derived schemes, derived algebraic stacks, and the Artin-Lurie representability theorem. Through the example of deformations of smooth and proper schemes, we explain how DAG sheds light on classical deformation theory. In the last two sections, we introduce differential forms on derived stacks, and then specialize to shifted symplectic forms, giving the main existence theorems proved in ptvv.

Vol. 54

An excursion into p-Adic Hodge theory: from foundations to recents trends

F. Andreatta, R. Brasca, O. Brinon, X. Caruso, B. Chiarellotto, G. Freixas i Montplet, S. Hattori, N. Mazzari, S. Panozzo, M. Seveso, G. Yamashita

(edited by A. Mézard)

ISBN 978-2-85629-913-5
2019 - 284 pages - Softcover. 17 x 24
Public: 50 € - Members: 35 €

This volume offers a progressive and comprehensive introduction to p-adic Hodge theory. It starts with Tate's works on p-adic divisible groups and the cohomology of p-adic varieties, which constitutes the main concrete motivations for the development of p-adic Hodge theory. It then moves smoothly to the construction of Fontaine's p-adic period rings and their apparition in several comparison theorems between various p-adic cohomologies. Applications and generalizations of these theorems are subsequently discussed. Finally, Scholze's modern vision on p-adic Hodge theory, based on the theory of perfectoids, is presented.

Vol. 53

Advanced Topics in Random Matrices

F. Benaych-Georges, Ch. Bordenave, M. Capitaine, C. Donati-Martin, A. Knowles

(edited by F. Benaych-Georges, D. Chafaï, S. Péché, B. de Tilière)

ISBN 978-2-85629-850-3
2018 - 190 pages - Softcover. 17 x 24
Public: 45 € - Members: 32 €

This book provides three accessible panoramas and syntheses on advanced topics in random matrix theory:
- local semicircle law for Wigner matrices, and applications to eigenvectors delocalization, rigidity of eigenvalues, and fourth moment theorem;
- spectrum of random graphs, recent advances on eigenvalues and eigenvectors, and open problems;
- deformed random matrices and free probability, unified understanding of various asymptotic phenomena such as spectral measure description, localization and fluctuations of extremal eigenvalues, eigenvectors behavior.

Vol. 52

Around the Zilber-Pink Conjecture

P. Habegger, G. Rémond, T. Scanlon, E. Ullmo and A. Yafaev

ISBN 978-2-85629-856-5
2017 - 284 pages - Softcover. 17 x 24
Public: 55 € - Members: 38 €

Following Faltings and Vojta's work proving the Mordell-Lang conjecture for abelian varieties and Raynaud's work proving the Manin-Mumford conjecture, many new Diophantine questions appeared, often described as problems of unlikely intersections. The arithmetic of moduli spaces of abelian varieties and more generally Shimura varieties has been parallely developed, around the central André-Oort conjecture. These two themes can be placed in a common frame - the Zilber-Pink conjecture. This volume proposes an introduction to these problems and to the various techniques used : geometry, height theory, reductive groups and Hodge theory, Shimura varieties, model theory via the notion of o-minimal structure. It contains texts corresponding to courses presented at CIRM, in May 2011, by Philipp Habegger, Gaël Rémond, Thomas Scanlon, Emmanuel Ullmo and Andrei Yafaev and an ample introduction by E. Ullmo, centered on the notion of bi-algebraicity, aiming at a presentation of the general setting.

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B. Edixhoven, Ph. Gille, P. Polo et G. Prasad, éd.
Autour des schémas en groupes
École d'été « Schémas en groupes », Group Schemes, A celebration of SGA3, Volume III
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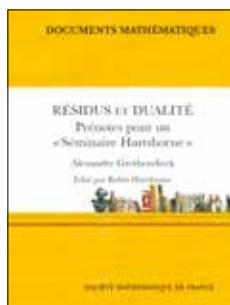
Vol. 21
Résidus et dualités, prénotes pour un « Séminaire Hartshorne »
A. GROTHENDIECK, édité par R. HARTSHORNE

ISBN 978-2-85629-983-8
2024 - 193 pages - Hardcover. 17 x 24
Public: 43 € - Members: 30 € (À paraître en janvier 2024)

À l'automne 1963, un séminaire sur les théorèmes de dualité en géométrie algébrique eut lieu à Harvard. Il s'agissait de comprendre comment l'usage systématique d'un nouvel outil alors révolutionnaire, les catégories dérivées, avait permis à Grothendieck de généraliser à un cadre relatif les énoncés de dualité de Serre pour les variétés projectives sur un corps. Ce sont les notes tapuscrites que Grothendieck rédigea pour Hartshorne, le promoteur du séminaire, que nous publions ici. Restées inédites jusqu'à présent, elles montrent le mathématicien à l'œuvre à une époque où il atteignait le sommet de sa créativité. L'édition est accompagnée d'une préface de Hartshorne détaillant la genèse des idées présentées au séminaire ainsi que les différences par rapport à sa monographie *Residues and Duality* où les résultats parurent pour la première fois en 1966.
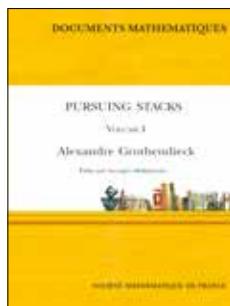
Vol. 20
Pursuing Stacks (volume I)
A. GROTHENDIECK, édité par G. MALTSINIOTIS

ISBN 978-2-85629-958-6
2022 - 446 pages - Hardcover. 17 x 24
Public: 75 € - Members: 53 €

Despite what its title suggests, *Pursuing Stacks* (or at least the part of the project that Grothendieck carried out under the name of *The Modelizing Story* or Histoire de Modèles) is not about the pursuit of stacks. Only the thirteen first sections, as well as, partially, sections 15–21 and 27, are about stacks. Furthermore, it is mainly about ∞-stacks on the point, i.e. weak ∞-groupoids. The only reflections on stacks on arbitrary topoi, as natural coefficients for a non-abelian cohomology, are purely heuristic. The rest of the hundred and forty sections deals with homotopy theory : the search for models for homotopy types (and more particularly for small categories whose presheaf category models canonically homotopy types : the test categories), homotopy structures, contractibility and asphericity structures, abelianization and schematization of homotopy types. Grothendieck was planning to come back later to ∞-stacks on topoi and to develop, in one or two additional volumes, what he had sketched out in his letters to Breen (letters that he included in *Pursuing Stacks* as an appendix), but he never did it. Nevertheless, the search for models for homotopy types is closely related to ∞-stacks, since according to the "homotopy hypothesis", a fundamental conjecture of Grothendieck, the weak ∞-groupoids model homotopy types.
The first volume of this edition consists of the first four chapters (sections 1–91 and 95–98). In a second volume, we will publish the last three chapters, the letters to Breen, as well as the correspondence of Grothendieck with several mathematicians, around the themes of *Pursuing Stacks*.
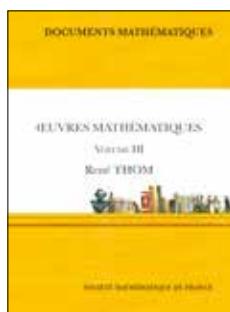
Vol. 19
Œuvres mathématiques de René Thom (volume III)

ISBN 978-2-85629-942-5
2022 - 691 pages - Hardcover. 17 x 24
Public: 85 € - Members: 60 €

Ce dernier volume des œuvres mathématiques complètes de René Thom contient le cours Fermi *Modèles mathématiques de la morphogénèse* donné à l'École normale supérieure de Pise en 1971, suivi d'articles publiés de 1972 à 1997, le tout assorti d'inédits et de commentaires mettant l'ensemble en perspective. Comme le précédent, ce volume III inclut des textes où des mathématiques très novatrices et leurs applications s'imbriquent avec une grande richesse. Beaucoup d'entre eux reflètent l'extraordinaire succès de la théorie des catastrophes dans les années soixante-dix. Le volume commence par une bibliographie mise à jour des œuvres de Thom, mathématiques ou non.
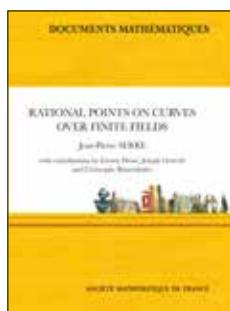
Vol. 18
Rational Points on Curves over finite fields
J-P. Serre, with contributions by E. Howe, J. Oesterlé and C. Ritzenthaler

ISBN 78-2-85629-923-4
2020 (réimpression 2022) - 188 pages - Hardcover. 17 x 24
Public: 45 € - Members: 32 €

In 1985, Jean-Pierre Serre gave a series of lectures at Harvard University on the number of points of curves over finite fields. Based on notes taken at that time by F. Q. Gouvêa, the present revised and completed document provides an insightful introduction to this beautiful topic and to most of the ideas that have been developed in this area during the last 30 years.
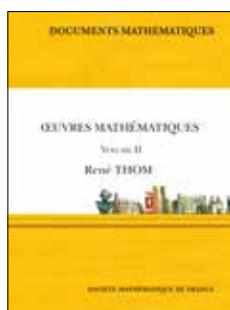
Vol. 17
Œuvres mathématiques de René Thom (Volume II)

ISBN 978-2-85629-888-6
2019 - 630 pages - Hardcover. 17 x 24
Public: 75 € - Members: 53 €

Ce deuxième volume des œuvres mathématiques complètes de René Thom contient le cours sur les singularités donné à Bonn en 1959, puis les articles publiés entre 1962 et 1971, assortis d'inédits et de commentaires mettant le tout en perspective. L'impressionnante contribution de Thom à la classification topologique des singularités d'applications différentiables et à la théorie des ensembles stratifiés figure pour l'essentiel ici. On y trouve aussi les articles fondateurs sur les catastrophes, avant la mode et les polémiques des années soixante-dix - les commentaires devraient aider à y voir plus clair. Le volume commence par une bibliographie des œuvres de Thom, mathématiques ou non.
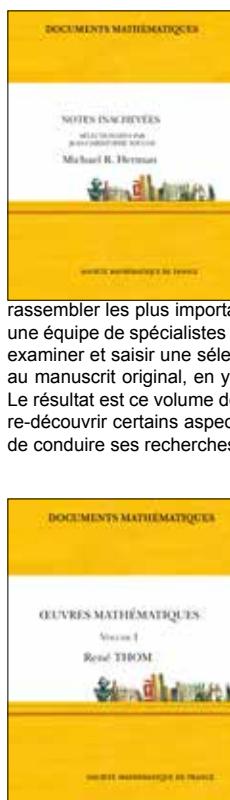
Vol. 16
### Notes inachevées sélectionnées par J.-C. Yoccoz
M. R. HERMAN

ISBN 978-2-85629-867-1
2018 - 200 pages - Hardcover. 17 x 24
Public: 50 € - Members: 35 €

Michel Herman était un spécialiste de premier plan de la théorie des systèmes dynamiques. À sa disparition soudaine, il a laissé un grand nombre de notes manuscrites, dont certaines de grande qualité qui n'ont jamais été publiées. Jean-Christophe Yoccoz, son exécuteur testamentaire scientifique, qui était aussi un de ses premiers étudiants et un des interlocuteurs mathématiques les plus proches de son cœur, a eu l'idée de rassembler les plus importantes de ces notes et de les rendre disponibles pour la communauté. À cette fin, il a réuni une équipe de spécialistes dans les divers domaines de recherche de M. Herman qui ont uni leurs forces pour classer, examiner et saisir une sélection de ces notes. La ligne directrice de ce travail collectif était d'adhérer le plus possible au manuscrit original, en y ajoutant si nécessaire quelques corrections ou commentaires pour en faciliter la lecture. Le résultat est ce volume de notes non publiées à travers lesquelles nous espérons que le lecteur pourra découvrir ou re-découvrir certains aspects de la pensée mathématique de Michel Herman, de ses centres d'intérêt et de sa façon de conduire ses recherches.

Vol. 15
Œuvres mathématiques de René Thom (Volume I)

ISBN 978-2-85629-816-9
2017 (réimpression 2022) - 573 pages - Hardcover. 17 x 24
Public: 78 € - Members: 55 €

Le premier volume des œuvres mathématiques complètes de René Thom contient les articles publiés avant 1960, assortis d'inédits passionnants et de commentaires les mettant en perspective. La contribution de Thom à la topologie algébrique et différentielle, née au contact d'Henri Cartan et de Charles Ehresmann et qui valut à son auteur la médaille Fields en 1958, figure pour l'essentiel ici. Viennent ensuite les articles fondateurs sur les singularités, qui seront poursuivis dans les années soixante et donneront naissance à la théorie des catastrophes. Le volume commence par une biographie substantielle et une bibliographie des œuvres de Thom, mathématiques ou non.

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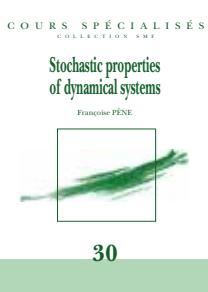

Vol. 30
Stochastic properties of dynamical systems
F. PÈNE

ISBN 978-2-85629-967-8
2022 - 276 pages - Hardcover. 17 x 24
Public: 54 € - Members: 38 €

This book provides an introduction to the study of the stochastic properties of probability preserving dynamical systems. Only the usual knowledge of the first year of a Master's degree is required. Many reminders are given. The definitions and results are illustrated by examples and corrected exercises. The book presents the notions of Poincaré's recurrence, of ergodicity, of mixing. It enlights also existing links between dynamical systems and Markov chains. The final objective of this book is to present three methods for establishing central limit theorems in the context of chaotic dynamical systems: a first method based on martingale approximations, a second method based on perturbation of quasi-compact linear operators and a third method based on decorrelation estimates.
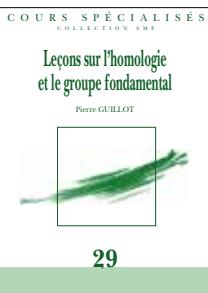

Vol. 29
Leçons sur l'homologie et le groupe fondamental
P. GUILLOT

ISBN 978-2-85629-965-4
2022 - 334 pages - Hardcover. 17 x 24
Public: 60 € - Members: 42 €

Cet ouvrage reproduit, en les complétant, des notes de cours donnés par l'auteur en M1 et en M2 à l'université de Strasbourg en topologie algébrique. Après des préliminaires concernant l'homotopie, le groupe fondamental, les catégories et les foncteurs, on y aborde l'homologie des complexes simpliciaux puis des espaces topologiques généraux. Les applications classiques sont traitées (théorème de Brouwer, théorème de la boule chevelue, caractéristique d'Euler des solides platoniciens...) et on donne une introduction à la dualité de Poincaré. Dans une troisième partie plus avancée, l'algèbre homologique est étudiée plus en profondeur, avant que la théorie des faisceaux ne soit développée. Le cours se conclut sur la démonstration du difficile théorème dû à Georges de Rham qui fait le lien entre homologie et formes différentielles.
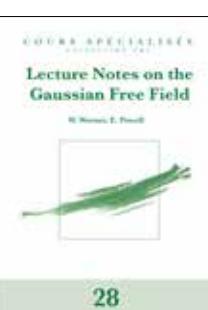
Vol. 28
Lecture Notes on the Gaussian Free Field
W. WERNER, E. POWELL

ISBN 978-2-85629-952-4
2021 - 184 pages - Hardcover. 17 x 24
Public: 43 € - Members: 30 €

The Gaussian Free Field (GFF) in the continuum appears to be the natural generalization of Brownian motion, when one replaces time by a multidimensional continuous parameter. While Brownian motion can be viewed as the most natural random real-valued function defined on R^+ with $B(0)=0$, the GFF in a domain D of R^d for $d \geq 2$ is a natural random real-valued generalized function defined on D with zero boundary conditions on D. The goal of these lecture notes is to describe some aspects of the continuum GFF and of its discrete counterpart defined on lattices, with the aim of providing a gentle self-contained introduction to some recent developments on this topic, such as the relation between the continuum GFF, Brownian loop-soups and the Conformal Loop Ensembles CLE4.

Vol. 27
Cycles analytiques complexes II : l'espace des cycles
D. BARLET, J. MAGNUSSON

ISBN 978-2-85629-907-4
2020 - 567 pages - Hardcover. 17 x 24
Public: 75 € - Members: 53 €

Ce second volume commence par donner la construction de l'espace des cycles compacts d'un espace complexe donné. On y trouvera les démonstrations des résultats admis dans le premier volume. Les chapitres qui suivent traitent des sujets dont voici la liste :
- Classe fondamentale d'un cycle. Relation entre famille analytique de cycles et classe fondamentale relative.
- Théorie de l'intersection avec paramètres dans une variété complexe puis dans un espace complexe quasi-lisse.
- Variété de Chow et espace des cycles d'un espace complexe quasi-projectif.
- Morphisme Douady → Cycles.
- Convexité holomorphe dans l'espace des cycles compacts et intégration de classes de $\partial^{\bar{}}$-cohomologie.
- L'espace des cycles compacts d'une variété Kählérienne est Kählérien.

Vol. 26
An introduction to expander graphs
E. KOWALSKI

ISBN 978-2-85629-898-5
2019 - 276 pages - Hardcover. 17 x 24
Public: 50 € - Members: 35 €

Expander graphs are families of finite graphs that are simultaneously relatively sparse and highly connected. Since their discovery in the lates 1960s, they have appeared in many seemingly unrelated areas of mathematics, from theoretical computer science to arithmetic and algebraic geometry, from representation theory to number theory. The goal of this book is to present the theory of expander graphs and to explore some of these rich connections. Besides a careful exposition of the basic parts of the theory, including the Cheeger constant, random walks and spectral gap characterizations of expander graphs, it contains many different constructions of various families of expander graphs. The applications that are surveyed in the last chapter try to communicate the remarkable reach of expander graphs in modern mathematics.

Vol. 25
Lectures on Elliptic Methods for Hybrid Inverse Problems
G. S. ALBERTI, Y. CAPDEBOSCQ

ISBN 978-2-85629-872-5
2018 - 226 pages - Hardcover. 17 x 24
Public: 45 € - Members: 32 €

In recent years, several new imaging modalities have been developed in order to be able to detect physical parameters simultaneously at a high spatial resolution and with a high sensitivity to contrast. These new approaches typically rely on the interaction of two physical imaging methods, and the corresponding mathematical models are the so-called hybrid, or coupled-physics, inverse problems. The combination of two physical modalities poses new mathematical challenges: the analysis of this new class of inverse problems requires the use of various mathematical tools, often of independent interest. This book intends to provide a first comprehensive course on some of these tools (mainly related to elliptic partial differential equations) and on their applications to hybrid inverse problems. For certain topics, such as the observability of the wave equation, the generalisation of the Radó-Kneser-Choquet Theorem to the conductivity equation, complex geometrical optics solutions and the Runge approximation property, we review well-known results. The material is presented with a clear focus on the intended applications to inverse problems. On other topics, including the regularity theory and the study of small-volume perturbations for Maxwell's equations, scattering estimates for the Helmholtz equation and the study of non-zero constraints for solutions of certain PDE, we discuss several new results. We then show how all these tools can be applied to the analysis of the parameter reconstruction for some hybrid inverse problems: Acousto-Electric tomography, Current Density Impedance Imaging, Dynamic Elastography, Thermoacoustic and Photoacoustic Tomography.
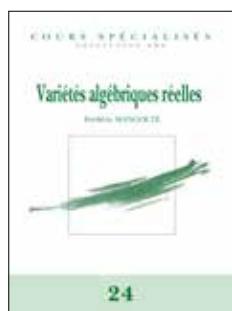
Vol. 24
Variétés algébriques réelles
F. Mangolte

ISBN 978-2-85629-864-0
2017 - 484 pages - Hardcover. 17 x 24
Public: 70 € - Members: 49 €

Les variétés algébriques réelles sont omniprésentes. Ce sont les premiers objets rencontrés lors de l'apprentissage des coordonnées puis des équations. Pourtant l'étude systématique de ces objets, si élémentaires soient-ils, est redoutable. Ce livre s'adresse à deux types de publics : il s'agit tout autant d'accompagner le lecteur, muni du seul bagage d'algèbre et géométrie niveau master, dans l'apprentissage des bases de cette riche théorie que d'apporter au lecteur plus avancé de nombreux résultats fondamentaux souvent absents de la littérature disponible, le fameux « folklore ». En particulier, l'introduction pour les non-spécialistes des méthodes topologiques de la théorie constitue l'une des originalités de l'ouvrage. Les trois premiers chapitres présentent les bases et les méthodes classiques de la géométrie algébrique complexe et réelle. Les trois derniers chapitres se concentrent chacun sur un aspect plus spécifique des variétés algébriques réelles. Un panorama des connaissances classiques y est dressé ainsi que des développements majeurs de ces vingt dernières années en matière de topologie et géométrie des variétés de dimension deux et trois, sans oublier les courbes, sujet central du fameux XVIe problème de Hilbert. Des exercices de niveaux variés sont proposés et les solutions de bon nombre d'entre eux sont données à la fin de chaque chapitre.

Vol. 10 (nouvelle impression)
Théorie de Hodge et géométrie algébrique complexe
C. Voisin

ISBN 978-2-85629-129-0
2016 - 595 pages - Hardcover. 17 x 24
Public: 50 € - Members: 35 €

Ce livre se situe à l'interface de la géométrie différentielle complexe et de la géométrie algébrique complexe. La première partie de l'ouvrage présente les résultats fondamentaux de la théorie de Hodge, incluant quelques chapitres préliminaires sur la géométrie kählérienne et la cohomologie des faisceaux. Elle se conclut sur la notion de structure de Hodge et sur l'étude de sa dépendance vis-à-vis de la structure complexe. La seconde partie, d'un niveau plus avancé, présente les applications de la théorie de Hodge à la géométrie algébrique complexe. Elle débute par une étude de la topologie des familles de variétés algébriques, d'un point de vue à la fois classique et moderne, et se poursuit par des applications de la théorie des variations infinitésimales de structure de Hodge. Elle se conclut enfin par l'exposition des liens entre la théorie de Hodge et celle des cycles algébriques, débouchant sur les fameuses conjectures de Bloch et Beilinson. Ce livre est ainsi destiné aux étudiants doctorants et aux chercheurs, qui y trouveront à la fois un exposé didactique complet et une présentation de l'état de la recherche dans le domaine, initié par Griffiths, des applications de la théorie de Hodge à l'étude des cycles algébriques.
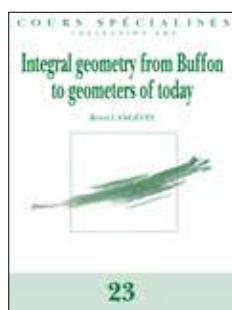
Vol. 23
Integral Geometry from Buffon to Geometers of Today
R. Langevin

ISBN 978-2-85629-822-0
2016 - 284 pages - Hardcover. 17 x 24
Public: 60 € - Members: 42 €

The little music of integral geometry, associated with the theory of geometric probabilities by L. A. Santaló, goes along with the main stream of mathematics since Buffon's Traité d'arithmétique morale in 1777. Integral geometry means to cut in all directions, or to project on all planes, all lines an object: a surface, a solid etc., and then observe and average. Statements are relations between what you got and the local geometry or topology of the object. Intersection and contact of an object with circles or spheres provide a conformal version of integral geometry. Pictures are an important part of the song.

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Vol. 33
SMF 2018 : Congrès de la Société Mathématique de France
E. BREUILLARD ed.

ISBN 978-2-85629-912-8
2019 - 432 pages - Softcover. 17 x 24
Public: 65 € - Members: 46 €

Ce volume rassemble les actes du 2e congrès de la Société Mathématique de France, qui a eu lieu à Lille en juin 2018.
This volumes gathers the proceedings of the 2nd Congress of the French Mathematical Society (SMF), which took place in Lille in June 2018.

Vol. 32
Spectral theory of graphs and of manifolds - CIMPA 2016 Kairouan, Tunisia
C. ANNÉ and Nabila TORKI-HAMZA eds.

ISBN 978-2-85629-895-4
2018 - 261 pages - Softcover. 17 x 24
Public: 28 € - Members: 20 €

Devoted to the Spectral Theory on Graphs and Manifolds, the CIMPA Research School which took place at Kairouan (Tunisia) in November 2016 proposed six courses and two conferences. You can find in this volume the redaction of five of them: an introduction to the Sprectral Theory on Combinatorial and Quantum Graphs by E. M. Harrell, an introduc-tion to the Sprectral Theory of Unbounded Operators by H. Najar, a presentation of the Study of the Absolute Sprectrum of Discrete Operators by S. Golenia, a presentation of Random Schrödinger Operators of Discrete Structures by C. Rojas-Molina and the presentation of the Theory of Critical Points at infinity on CR-manifolds by N. Gamara. The last one, on Geometric Bounds on the Eigenvalues of Graphs, by N. Anantaraman is just summarized as it was podcasted and is still available on Internet. Finally you can read the text of the conference of L. Hillairet on two applications of the Dirichlet-Neumann Bracketing.

Vol. 31
Actes du 1er congrès national de la SMF - Tours 2016
C. LECOUVEY, éd.

ISBN 978-2-85629-866-4
2017 - 136 pages - Softcover. 17 x 24
Public: 35 € - Members: 24 €

Ce volume groupe les contributions des conférenciers pléniers du congrès de la SMF. M.-C. Arnaud explique le lien entre dynamique hamiltonienne et méthodes variation-nelles lagrangiennes, pour introduire en douceur la théorie d'Aubry-Mather. S. Grivaux et C. Badea suggèrent de comprendre certaines classes d'entiers, les ensembles de Jamison et ensembles de Kazdhan, à l'aune de la théorie des opérateurs et de l'analyse harmonique. S. Gouëzel exploite toute la richesse des propriétés de sous-additivité et des horofonctions pour décrire le comportement asymptotique de produits de semi-contractions aléatoires. B. Toën et G. Vezzosi présentent une approche générale pour établir la formule du conducteur de Bloch, qui est une formule conjecturale décrivant le chan-gement de topologie dans une famille de variétés algébriques lorsque le paramètre se spécialise en une valeur critique. Enfin, A. Tsybakov, P. Bellec et G. Lecué s'intéressent à la performance de certains estimateurs des moindres carrés avec pénalisation et présentent les idées maîtresses et les outils qui ont permis de substantielles améliorations ces dernières années.

Vol. 30
PDE's, Dispersion, Scattering Theory and Control Theory
K. Ammari, G. Lebeau eds.

ISBN 978-2-85629-858-9
2017 - 153 pages - Softcover. 17 x 24
Épuisé

This book results from notes of the lectures given in Monastir from 10 to 14 June 2013 during the workshop about the dispersion and scattering theory and control theory of partial differential equations.
This volume contains surveys of active research topics, along with original research papers containing exciting new results on the PDE's, dispersion, scattering and control theory. It will therefore benefit both graduate students and researchers.

Vol. 29
Control and Stabilization of Partial Differential Equations
K. Ammari, ed.

ISBN 978-2-85629-817-6
2015 - 119 pages - Softcover. 17 x 24
Public: 25 € - Members: 18 €

This book results from notes of the lectures given in Monastir from 9 to 19 May 2011 during the CIMPA school Control and Stabilization of PDEs. Different control techniques for linear parabolic equations were presented and the deduction of the null controllability of such equations from local Carleman inequality was described. Overall Carleman-type and Hardy type inequalities for the null controllability of degenerate parabolic equations were discussed. Current issues in the control of conservation laws, such as the control of classical solutions in singular control limits, and the control solutions with shock waves, were also highlighted during this school. Finally, different techniques and methods for the stability of evolution equations with and without delay, applicable to Navier-Stokes equations were presented.

Vol. 28
Self-Similar Processes and their Applications
L. Chaumont, P. Graczyk, L. Vostrikova, eds.

ISBN 978-2-85629-365-2
2013 - 121 pages - Softcover. 17 x 24
Public: 29 € - Members: 20 €

This volume contains some articles related to the conference Self-similar processes and their applications which took place in Angers, from the 20th to the 24th of July 2009. Self-similarity is the property which certain stochastic processes have of preserving their distribution under a time-scale change. This property appears in all areas of probability theory and offers a number of fields of application. The aim of this conference is to bring together the main representatives of different aspects of self-similarity currently being studied in order to promote exchanges on their recent research and enable them to share their knowledge with young researchers.

Vol. 27
Geometric and Differential Galois Theories
D. Bertrand, Ph. Boalch, J-M. Couveignes, P. Dèbes, eds.

ISBN 978-2-85629-364-5
2013 - 247 pages - Softcover. 17 x 24
Public: 44 € - Members: 31 €

On March 29th April 2nd, 2010, a meeting was organized at the Luminy CIRM (France) on geometric and differential Galois theories, witnessing the close ties these theories have woven in recent years. The present volume collects the Proceedings of this meeting. Although it may be viewed as a continuation of the one held 6 years earlier on arithmetic and differential Galois groups (see *Séminaires Congrès*, vol. 13), several new and promising themes have appeared. The articles gathered here cover the following topics: moduli spaces of connexions, differential equations and coverings in finite characteristic, liftings, monodromy groups in their various guises (tempered fundamental group, motivic groups, generalized difference Galois groups), and arithmetic applications.

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24-II - 2012 - 385 pages - Public: 77 € - Members: 54 €

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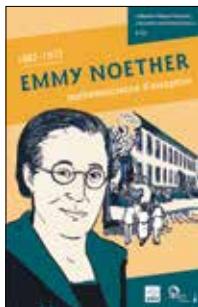
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collection « Maison Poincaré [Regards mathématiques] ».

ISBN 978-2-85629-976-0
2023 - 32 pages - Softcover. 16 x 24 cm
Public: 9 € - Members: 9 €

À une époque où les femmes avaient difficilement accès à l'université, Emmy Noether (1882-1935) parvint à influencer toute une génération de mathématiciens et mathématiciennes et laisse une empreinte fondamentale sur les mathématiques. Ce fascicule permet de découvrir la vie de cette scientifique hors norme dont les théorèmes ont marqué la physique mathématique et à qui l'on doit la fondation de l'algèbre moderne !
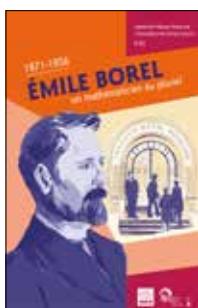
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ISBN 978-2-85629-962-3
2022 - 32 pages - Softcover. 16 x 24 cm
Public: 9 € - Members: 9 €

Émile Borel, homme de sciences et intellectuel engagé dans la cité, est un mathématicien aux multiples activités. Ses travaux en analyse et probabilités sont motivés par son intérêt pour les problèmes de la physique et de la vie sociale. Homme d'action, de réseaux, il s'implique dans la diffusion des sciences et la pédagogie, et est un acteur majeur du milieu intellectuel de la première moitié du vingtième siècle en Europe. Portrait d'un savant dont les intuitions et engagements nous parlent encore aujourd'hui !
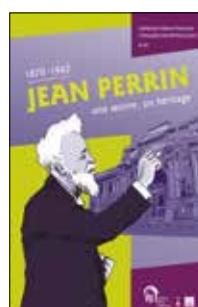
Jean Perrin, une œuvre, un héritage
collection « Maison Poincaré [Regards mathématiques] ».

ISBN 978-2-85629-949-4
2021 - 32 pages - Softcover. 16 x 24 cm
Public: 8 € - Members: 8 €

Un fascicule consacré à Jean Perrin, une personnalité scientifique flamboyante de la première moitié du XXe siècle qui reçut le prix Nobel de physique en 1926 pour avoir prouvé expérimentalement l'existence des atomes. Outre ses œuvres scientifiques, Jean Perrin laisse en héritage une vision de l'organisation de la recherche et de l'engagement des scientifiques dans la société, un élan et un enthousiasme qui nous touchent encore aujourd'hui.

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P. CARTIER, A. CONNES, C. MACLARTY, J.-J. SZCZECINIARZ, O. CARAMELLO, L. LAFFORGUE, G. PISIER, F. ZALAMEA.

ISBN 978-2-85629-950-0
2021 - 304 pages - Softcover. 16 x 24 cm
Public: 32,90 € - Members: 23 €

Lectures grothendieckiennes rassemble les textes qui font suite à un séminaire qui s'est tenu au département de mathématiques de l'École Normale Supérieure de 2017 à 2018. Le livre présente une pensée complexe à l'œuvre, celle de l'un des mathématiciens les plus influents et énigmatiques du 20e siècle : Alexander Grothendieck. Les auteurs, Pierre Cartier, Olivia Caramello, Alain Connes, Laurent Lafforgue, Colin McLarty, Gilles Pisier, Jean-Jacques Szczeciniarz et Fernando Zalamea, dévoilent à leur façon les conséquences mathématiques ou philosophiques que l'on peut tirer d'une œuvre monumentale qui a transformé le paysage mathématique du 20e siècle et qui a probablement ouvert une nouvelle ère mathématique que nous avons seulement commencé à explorer.

La France mathématique de la IIIe république avant la grande guerre

H. GISPERT

ISBN 978-2-85629-797-1
ST3 - 2015 - 358 pages - Softcover. 16 x 24 cm
Public: 45 € - Members: 32 €

Ce livre est la réédition - mise en perspective grâce à une préface qui revient sur vingt ans de résultats, d'enquêtes, d'apports méthodologiques en histoire des mathématiques - de l'ouvrage paru en 1991 consacré à La France mathématique de 1870 à 1914. S'attachant à l'étude des membres de la SMF et de leur production, aux grandes figures des mathématiques mais aussi à de nombreux autres acteurs et à leurs institutions, l'auteure dresse le tableau des grands bouleversements de la France mathématique des premières décennies de la Troisième République.

La Gazette des 150 ans

ISBN 978-2-85629-975-3
2023 - 132 pages - Softcover. 21 x 27
Public: 25 € - Members: 18 €

Née en 1963, la Gazette est devenue un haut lieu de diffusion, de réflexion et d'action au sein de la communauté mathématique française. Célébrant les 150 ans de l'honorable SMF, ce numéro spécial prend la forme d'une Gazette vintage dans laquelle vous retrouverez vos rubriques habituelles, mais dont le matériau est tout entier issu des parutions antérieures à la version moderne et colorée qui a vu le jour en 2015. Vous revivrez ainsi les moments les plus intenses, profonds, enthousiastes ou même amusants de la revue. Articles de mathématiques d'anthologie, discussions engagées sur l'enseignement, la parité ou les mathématiques elles-mêmes, entretiens passionnants, recension au vitriol ou encore nécrologie à dévorer, ces perles rendent un hommage lumineux et malheureusement bien trop court à notre irremplaçable revue.

Jean-Pierre Kahane

ISBN 978-2-85629-902-9
2019 - 80 pages - Softcover. 21 x 27
Public: 25 € - Members: 18 €

Entré au CNRS en 1950, et mort au travail (comme il le souhaitait) en 2017, Jean-Pierre Kahane a eu une carrière scientifique très longue et féconde, avec des centres d'intérêt assez variés (il aimait se qualifier, avec un grain de sel, d'amateur en Mathématiques) dont voici un échantillon : fonctions entières et séries de Dirichlet, théorie analytique des nombres, analyse de Fourier et ensembles minces, analyse fonctionnelle (algèbres de Banach), probabilités discrètes (inégalités de Khintchine-Kahane) ou continues (mouvement brownien, chaos multiplicatif, etc.). Le présent numéro de la Gazette a pour ambition de rendre hommage à cette personnalité et ce mathématicien de grande envergure, sous forme d'hommages et de souvenirs personnels de la part des mathématiciens qui l'ont rencontré ou ont collaboré avec lui. Ce volume présente aussi quelques-unes des principales contributions de Jean-Pierre Kahane, le tout replacé dans le contexte de sa longue carrière (1961-2017) à l'université d'Orsay.
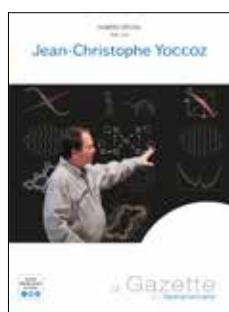
Jean-Christophe Yoccoz

ISBN 978-2-85629-879-4
2018 - 132 pages - Softcover. 21 x 27
Public: 25 € - Members: 18 €

Jean-Christophe Yoccoz était une figure emblématique de l'école mathématique française. Professeur au Collège de France, académicien, il avait reçu la médaille Fields en 1994. Impressionnant par la rapidité, la profondeur et l'élégance de sa pensée, il a considérablement influencé les différentes branches des systèmes dynamiques. Il marquait son entourage par sa personnalité attachante, sa simplicité et sa gentillesse. Ce volume rend hommage à différentes facettes de la vie mathématique de Jean-Christophe Yoccoz. Il comprend à la fois des textes de souvenirs et des présentations de ses plus importants travaux scientifiques.
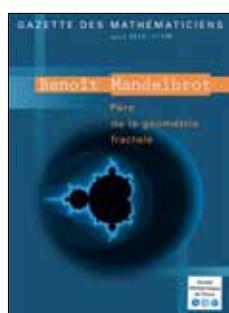
Benoît Mandelbrot, père de la géométrie fractale
sous la direction de S. Jaffard et S. Seuret

ISBN 978-2-85629-360-7
GA136 - 2013 - 192 pages - Softcover. 17 x 24
Public: 25 € - Members: 18 €

Bien plus que tout autre, le nom de Benoît Mandelbrot est associé à la géométrie fractale. Ce mathématicien franco-américain, mais aussi physicien, informaticien, a bousculé les frontières entre disciplines. Son regard sans *a priori* s'est attaché à la description de phénomènes mathématiques, physiques et géophysiques, économiques, sociologiques, faisant fi des théories préexistantes. Dans cet ouvrage, de proches collaborateurs témoignent des bouleversements qu'il a apportés dans chacune de leurs disciplines. Au travers de leurs textes surgit le portrait d'une personnalité scientifique hors norme.

René Thom (1923-2002)

ISBN 978-2-85629-163-4
2004 - 142 pages - Softcover. 14,5 x 24
Public: 25 € - Members: 18 €

Qu'on connaisse l'homme et son œuvre ou qu'on les découvre à la lecture de ce livre, on ne peut qu'être fasciné par ce mathématicien d'exception doublé d'un philosophe pris dans les turbulences des polémiques scientifiques ; fasciné aussi par cet homme libre, qui écrit : « Au moment où tant de savants calculent de par le monde, n'est-il pas souhaitable que d'aucuns, s'ils le peuvent, rêvent ? ».

Cinq minutes de mathématiques
E. Behrends, traduit par Y. Haralambous

ISBN 978-2-85629-325-6
ST2 - 2011 - 387 pages - Softcover. 16 x 24 cm
Public: 33 € - Members: 23 €

Une délicieuse promenade autour de mathématiques accessibles sans connaissances avancées, par tranche de cinq minutes.
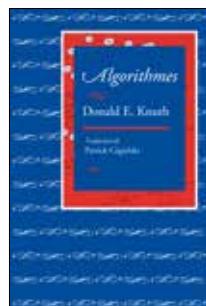
Algorithmes
D. Knuth, traduit par P. Cégielski

ISBN 978-1-57586-620-8
510 pages - Softcover. 15 x 23 cm
Public: 32 € - Members: 22 €

Donald Knuth n'est pas seulement l'inventeur de TeX, indispensable aux scientifiques d'aujourd'hui. C'est avant tout un informaticien de légende, auteur de grands classiques sur l'art de la programmation et les mathématiques discrètes. Voici aujourd'hui une sélection de ses articles traduits en franççais. Les titres des différents chapitres suffisent à aiguiser la curiosité : « Mathématiques et informatique : faire face au fini » ; « les problèmes récréatifs sont-ils utiles ? »; « les liens valsants », etc.
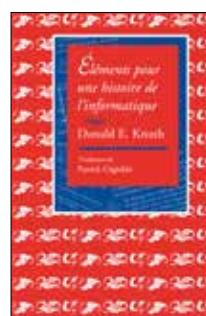
Éléments pour une histoire de l'informatique
D. Knuth, traduit par P. Cégielski

ISBN 978-1-57586-622-2
372 pages - Softcover. 15 x 23 cm
Public: 32 € - Members: 22 €

Voici la traduction en français d'une série de quinze articles classiques de Donald E. Knuth portant sur des moments clés de l'histoire de l'informatique, plus exactement l'algorithmique, que ce soit à l'époque babylonienne ancienne, au neuvième siècle lors de l'âge d'or des sciences arabes ou après l'invention des ordinateurs : étude des premiers programmes, des premiers langages de programmation et des premiers compilateurs. On y retrouve également l'historique des notions chères à Knuth : découpage d'un paragraphe en ligne, grammaires à attributs et vocabulaire de l'analyse des algorithmes.

Une histoire de Jacques Feldbau
M. Audin

ISBN 978-2-85629-277-8
ST1 - 2010 - 132 pages - Softcover. 16 x 24 cm
Public: 23 € - Members: 17 €

Michèle Audin retrace l'activité mathématique et la vie de Jacques Feldbau né en 1914, empêché d'enseigner et de publier sous son nom par la législation antisémite de Vichy et mort en déportation en 1945.

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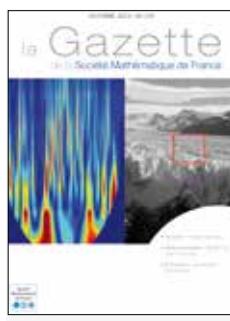
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