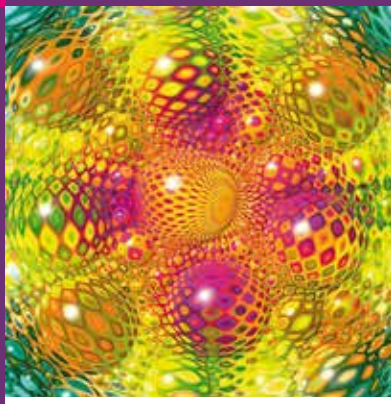
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Vol. 462

Séminaire Bourbaki volume 2024/2025, exposés 1227-1241

ISBN 978-2-37905-217-0
2025 - 602 pages - Softcover. 17 x 24
Public: 95 € - Members: 67 €

Ce 76e volume du Séminaire Bourbaki contient les textes des quinze exposés présentés pendant l'année 2024/2025 : paysage dirigé, lissification de cycles algébriques, conjecture de Deligne pour les puissances symétriques des formes modulaires, bornes pour les nombres de Ramsey, interprétation probabiliste de théories quantiques des champs, théorie de l'homotopie quantitative, estimations uniformes pour l'équation de Landau, théorie spectrale et systèmes intégrables, conjecture de résolution en solitons, hypoellipticité et conjecture de Helffer et Nourrigat, moments de fonctions L et stabilité homologique, dualité de Langlands relative, géométrisation de la correspondance de Langlands, logique continue des corps globalement valués, homotopie motivique.



Vol. 461

Isolated quotient singularities in positive characteristic

C. Liedtke, G. Martin, Y. Matsumoto

ISBN 978-2-37905-220-0
2025 - 162 pages - Softcover. 17 x 24
Public: 51 € - Members: 36 €

This book deals with isolated quotient singularities by finite group schemes over algebraically closed fields of positive characteristic. In the first part, we study isolated quotient singularities by finite and linearly reductive group schemes and show that they satisfy many, but not all, of the known properties of finite quotient singularities in characteristic zero. This includes the reconstruction of the quotient presentation from the singularity, Schlessinger's rigidity theorem, and classification results of Klein and Brieskorn. In the second part, we study torsors over the punctured spectrum of an isolated singularity, with an emphasis on rational double point singularities. As applications, we show that not all rational double points are quotient singularities and we extend the Flenner-Mumford criterion for smoothness of a normal surface germ to positive characteristic, generalizing work of Esnault and Viehweg.



Vol. 460

Cellular E_k-algebras

S. Galatius, A. Kupers, et O. Randal-Williams

ISBN 978-2-37905-219-4
2025 - 299 pages - Softcover. 17 x 24
Public: 72 € - Members: 50 €

We give a set of foundations for cellular Ek-algebras which are especially convenient for applications to homological stability. We provide conceptual and computational tools in this setting, such as filtrations, a homology theory for Ek-algebras with a Hurewicz theorem, CW approximations, and many spectral sequences, which shall be used for such applications in future papers.

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Vol. 459

Finitude of physical measures for random maps

P. G. Barrientos, F. Nakamura, Y. Nakano, H. Toyokawa

ISBN 978-2-37905-214-9
2025 - 103 pages - Softcover. 17 x 24
Public: 46 € - Members: 32 €

For random compositions of independent and identically distributed measurable maps on a Polish space, we study the existence and finitude of absolutely continuous ergodic stationary probability measures (which are, in particular, physical measures) whose basins of attraction cover the whole space almost everywhere. We characterize and hierarchize such random maps in terms of their associated Markov operators, as well as show the difference between classes in the hierarchy by plenty of examples, including additive noise, multiplicative noise, and iterated function systems. We also provide sufficient practical conditions for a random map to belong to these classes. For instance, we establish that any continuous random map on a compact Riemannian manifold with absolutely continuous transition probability has finitely many physical measures whose basins of attraction cover the manifold Lebesgue almost everywhere.



Vol. 458

Regularized unbalanced optimal transport as entropy minimization with respect to branching Brownian motion

A. Baradat, H. Lavenant

ISBN 978-2-37905-211-8
2025 - 194 pages - Softcover. 17 x 24
Public: 59 € - Members: 41 €

It is well known that minimizing the entropy of a law with respect to the law of a Brownian motion under density constraints at the initial and final times, is equivalent to solving a regularized version of the quadratic optimal transport problem. In this work, we show that replacing Brownian motion by branching Brownian motion (BBM) implies allowing creation and destruction of mass in the resulting optimal transport model, with a cost depending on the offspring distribution of the reference BBM. This new model appears to converge to partial optimal transport in the small noise limit, and is suitable for numerical simulations.



Vol. 457

Structure of conjugacy classes in Coxeter groups

T. Marquis

ISBN 978-2-37905-201-9
2025 - 135 pages - Softcover. 17 x 24
Public: 46 € - Members: 32 €

This paper gives a definitive solution to the problem of describing conjugacy classes in arbitrary Coxeter groups in terms of cyclic shifts. Given a Coxeter system (W,S), a cyclic shift of an element w of W is a conjugate of w by a simple reflection whose length is at most the length of w. For a spherical subset K of S we also call two elements of W K-conjugate if they normalise the standard parabolic subgroup of type K and are conjugate to one another by its longest element. In this paper, we show that any two conjugate elements of W differ only by a sequence of cyclic shifts and K-conjugations, and explain how this sequence can be computed explicitely. Along the way, we obtain several results of independent interest, such as a description of the centraliser of an infinite order element w of W, as well as the existence of natural decompositions of w as a product of a «torsion part» and of a «straight part», with useful properties.

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Vol. 456

FBI transform in Gevrey classes and Anosov flows

Y. Guedes Bonthonneau, M. Jézéquel

ISBN 978-2-37905-209-5
2025 - 233 pages - Softcover. 17 x 24
Public: 59 € - Members: 41 €

This monograph has a triple purpose. The first chapter is dedicated to the study of semi-classical pseudo-differential operators whose symbols are Gevrey in all variables. In the second one, the theory of l-lagrangian functional spaces is presented, in the case that the lagrangian is not a compactly supported deformation of the cotangent. The relation with the operators presented before is also analyzed. In the last chapter, the theory is applied to the study of Gevrey Anosov flows, investigating in particular the growth of their dynamical determinants.



Vol. 455

Decomposition of the diagonal, intermediate Jacobians, and universal codimension-2 cycles in positive characteristic

J. D. Achter, S. Casalaina-Martin, C. Vial

ISBN 978-2-37905-200-2
2025 - 118 pages - Softcover. 17 x 24
Public: 46 € - Members: 32 €

We consider the connections among algebraic cycles, Abelian varieties, and stable rationality of smooth projective varieties in positive characteristic. Recently Voisin constructed two new obstructions to stable rationality for rationally connected complex projective threefolds by giving necessary and sufficient conditions for the existence of a cohomological decomposition of the diagonal. In this paper, we show how to extend these obstructions to rationally chain connected threefolds in positive characteristic via ℓ-adic cohomological decomposition of the diagonal. This requires extending results in Hodge theory regarding intermediate Jacobians and Abel-Jacobi maps to the setting of algebraic representatives. For instance, we show that the algebraic representative for codimension-two cycle classes on a geometrically stably rational threefold admits a canonical auto-duality, which in characteristic zero agrees with the principal polarization on the intermediate Jacobian coming from Hodge theory. As an application, we extend a result of Voisin, and show that in characteristic greater than two, a desingularization of a very general quartic double solid with seven nodes does not admit a universal codimension-two cycle class. In the process, we establish some results on the moduli space of nodal degree-four polarized K3 surfaces in positive characteristic.



Vol. 454

Séminaire Bourbaki, volume 2023-2024, exposés 1211-1226

ISBN 978-2-37905-206-4
2024 - 690 pages - Softcover. 17 x 24
Public: 90 € - Members: 63 €

Ce 75e volume du Séminaire Bourbaki contient les textes des seize exposés présentés pendant l'année 2023/2024 : représentations supercuspidales, prolongement analytique de fonctions *L*, deux preuves de la conjecture *P=W*, cohomologie des espaces de modules de courbes via la géométrie tropicale, théorie de Gromov-Witten réelle, sous-groupes exotiques de groupes hyperboliques, stabilité des trous noirs, équation cinétique associée à l'équation de Schrödinger, phénomène de coupure pour les chaînes de Markov, variétés à courbure scalaire strictement positive, complétion profinie et topologie des variétés de dimension 3, mesures de Gibbs non linéaires et limites de champ moyen, livres brisés pour des flots de Reeb, construction de nouveaux systèmes d'Euler, modules de persistance et leurs applications, uniformité en géométrie diophantienne.

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Vol. 453

The stabilization of the Frobenius-Hecke traces on the intersection cohomology of orthogonal Shimura varieties

Y. Zhu

ISBN 978-2-37905-203-3
2024 - 304 pages - Softcover. 17 x 24
Public: 66 € - Members: 46 €

We study Shimura varieties associated with special orthogonal groups over the field of rational numbers. We prove a version of Morel's formula for the Frobenius-Hecke traces on the intersection cohomology of the Baily-Borel compactification. Our main result is the stabilization of this formula. As an application, we compute the Hasse-Weil zeta function of the intersection cohomology in some special cases, using the recent work of Arthur and Taïbi on the endoscopic classification of automorphic representations of special orthogonal groups.



Vol. 452

Evolution of networks with multiple junctions

C. Mantegazza, M. Novaga, A. Pluda, F. Schulze

ISBN 978-2-85629-997-5
2024 - 254 pages - Softcover. 17 x 24
Public: 60 € - Members: 42 €

We consider the motion by curvature of a network of curves in the plane and we discuss existence, uniqueness, singularity formation, and asymptotic behavior of the flow.



Vol. 451

Dynamical complexity and controlled operator K-Theory

E. Guentner, R. Willett, G. Yu

ISBN 978-2-37905-202-6
2024 - 102 pages - Softcover. 17 x 24
Public: 42 € - Members: 29 €

In this paper, we introduce a property of topological dynamical systems that we call finite dynamical complexity. For systems with this property, one can in principle compute the K-theory of the associated crossed product C*-algebra by splitting it up into simpler pieces and using the methods of controlled K-theory. The main part of the paper illustrates this idea by giving a new proof of the Baum-Connes conjecture for actions with finite dynamical complexity. We have tried to keep the paper as self-contained as possible: we hope the main part will be accessible to someone with the equivalent of a first course in operator K-theory. In particular, we do not assume prior knowledge of controlled K-theory, and use a new and concrete model for the Baum-Connes conjecture with coefficients that requires no bivariant K-theory to set up.



Vol. 450

Bar codes of persistent cohomology and Arrhenius law for *p*-forms

D. Le Peutrec, F. Nier, C. Viterbo

ISBN 978-2-85629-993-7
2024 - 194 pages - Softcover. 17 x 24
Public: 54 € - Members: 38 €

The present work shows that counting or computing the small eigenvalues of the Witten Laplacian in the semi-classical limit can be done without assuming that the potential is a Morse function as the authors did in their previous article. In connection with persistent cohomology, we prove that the rescaled logarithms of these small eigenvalues are asymptotically determined by the lengths of the bar code of the potential function. In particular, this proves that these quantities are stable in the uniform convergence topology of the space of continuous functions. Additionally, our analysis provides a general method for computing the subexponential corrections in a large number of cases.

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Vol. 449

Configuration spaces of manifolds with boundary

R. Campos, N. Idrissi, P. Lambrechts, T. Willwacher

ISBN 978-2-85629-990-6
2024 - 122 pages - Softcover. 17 x 24
Public: 42 € - Members: 30 €

We study ordered configuration spaces of compact manifolds with boundary. We show that for a large class of such manifolds, the real homotopy type of the configuration spaces only depends on the real homotopy type of the pair consisting of the manifold and its boundary. We moreover describe explicit real models of these configuration spaces using three different approaches. We do this by adapting previous constructions for configuration spaces of closed manifolds which relied on Kontsevich's proof of the formality of the little disks operads. We also prove that our models are compatible with the richer structure of configuration spaces, respectively a module over the Swiss-Cheese operad, a module over the associative algebra of configurations in a collar around the boundary of the manifold, and a module over the little disks operad.



Vol. 448

Les suites spectrales de Hodge-Tate

A. Abbes, M. Gros

ISBN 978-2-85629-988-3
2024 - 482 pages - Softcover. 17 x 24
Public: 77 € - Members: 54 €

Ce livre présente deux résultats importants en théorie de Hodge p-adique suivant l'approche initiée par Faltings, à savoir (i) son principal théorème de comparaison p-adique, et (ii) la suite spectrale de Hodge-Tate. Nous établissons pour chacun de ces résultats deux versions, une absolue et une relative. Si les énoncés absolus pouvaient raisonnablement être considérés comme bien compris, notamment après leur extension aux variétés rigides par Scholze, l'approche initiale de Faltings pour les variantes relatives restait beaucoup moins étudiée. Bien que nous suivions la même stratégie que celle utilisée par Faltings pour établir son principal théorème de comparaison p-adique, une partie de nos preuves est basée sur de nouveaux résultats. La suite spectrale de Hodge-Tate relative est nouvelle dans cette approche.



Vol. 447

Massless phases for the Villain model in d ≥ 3

P. Dario, W. Wu

ISBN 978-2-85629-985-2
2024 - 221 pages - Softcover. 17 x 24
Public: 54 € - Members: 38 €

A major open question in statistical mechanics, known as the Gaussian spin wave conjecture, predicts that the low temperature phase of the Abelian spin systems with continuous symmetry behave like Gaussian free fields. In this paper we consider the classical Villain rotator model in dimension 3 and higher and prove that, at sufficiently low temperature, the two-point function behaves asymptotically as the one of a Gaussian free field. Along the way, we develop a quantitative perspective on homogenization of uniformly convex gradient Gibbs measures.



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.

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Vol. 187

Espaces FC(g(F)) et endoscopie

J.-L. WALDSPURGER

ISBN 978-2-37905-218-7
2025 - 148 pages - Softcover. 17 x 24
Public: 51 € - Members: 36 €

Soient F un corps p-adique et G un groupe réductif connexe défini sur F. On suppose que p est grand Notons g l'algèbre de Lie de G et introduisons la transformation de Fourier $f \to \hat{f}$ de $C_e^\infty(g(F))$, normalisée d'une facon habituelle. Dans un article précédent, on a défini l'espace FC(g(F)) des fonctions $f \in C_e^\infty(g(F))$ telles que les intégrales orbitales de f et de $\hat{f}$ s'annulent en tout élément de $g(F)$ qui n'est pas topologiquement nilpotent. Ces espaces sont conservés par transfert endoscopique. Ici, on suppose que G est absolument quasi-simple et simplement connexe et on définit une décomposition de $FC(g(F))$ en somme directe de sous-espaces de sorte que les propriétés relatives à l'endoscopie deviennent claires dans chaque sous-espace. En particulier, si G est quasi-déployé, on décrit le sous-espace $FC^{st}(g(F))$ des éléments stables de $FC(g(F))$.



Vol. 186

S-integral quadratic forms and homogeneous dynamics

I. CALDERON

ISBN 978-2-37905-210-1
2025 - 118 pages - Softcover. 17 x 24
Public: 46 € - Members: 32 €

Let S be a finite set of places of the rational numbers including the infinite one. Using homogeneous dynamics we establish a criterion of S-integral equivalence for integral quadratic forms, and we determine a finite set of generators of S-integral orthogonal groups.



Vol. 185

Iwasawa theory of twists of elliptic modular forms over imaginary quadratic fields at inert primes

K. BÜYÜKBODUK, A. LEI

ISBN 978-37905-208-8
2025 - 119 pages - Softcover. 17 x 24
Public: 46 € - Members: 32 €

We study the Iwasawa main conjectures for Rankin-Selberg convolutions of modular forms with mixed reduction types. We prove divisibility results towards these conjectures by optimizing the signed factorization procedures pertaining to Perrin-Riou functionals and Beilinson-Flach elements.

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Vol. 184

Global nonlinear stability of Minkowski space for spacelike-characteristic initial data

O. Graf

ISBN 978-2-37905-207-1
2025 - 309 pages - Softcover. 17 x 24
Public: 72 € - Members: 50 €

In this paper, we prove the global nonlinear stability of Minkowski space in the context of the spacelike-characteristic Cauchy problem for Einstein vacuum equations. Spacelike-characteristic initial data are posed on a compact 3-disk and on the future complete null hypersurface emanating from its boundary. Our result extends the seminal stability result for Minkowski space proved by Christodoulou and Klainerman for which initial data are prescribed on a spacelike 3-plane. The proof relies on the classical vectorfield method and bootstrapping argument from Christodoulou-Klainerman. The main novelty is the introduction and control of new geometric constructions adapted to the spacelike-characteristic setting. In particular, it features null cones with prescribed vertices, spacelike maximal hypersurfaces with prescribed boundaries and global harmonic coordinates on Riemannian 3-disks.



Vol. 183

On the *p*-adic uniformization of unitary Shimura curves

S. Kudla, M. Rapoport, T. Zink

ISBN 978-2-37905-204-0
2024 - 212 pages - Softcover. 17 x 24
Public: 54 € - Members: 38 €

We prove *p*-adic uniformization for Shimura curves attached to the group of unitary similitudes of certain binary skew Hermitian spaces V with respect to an arbitrary CM field K with maximal totally real subfield F. For a place $v|p$ of F that is not split in K and for which V_v is anisotropic, let v be an extension of v to the reflex field E. We define an integral model of the corresponding Shimura curve over $\mathrm{Spec}O_{E,(v)}$ by means of a moduli problem for abelian schemes with suitable polarization and level structure prime to p. The formulation of the moduli problem involves a Kottwitz condition, an Eisenstein condition, and an adjusted invariant. The uniformization of the formal completion of this model along its special fiber is given in terms of the formal Drinfeld upper half plane Ω_{F_v} for F_v. The proof relies on the construction of the contracting functor which relates a relative Rapoport-Zink space for strict formal O_{F_v}-modules with a Rapoport-Zink space of p-divisible groups which arise from the moduli problem, where the O_{F_v}-action is usually not strict when $F_v \neq Q_p$. Our main tool is the theory of displays, in particular the Ahsendorf functor.



Vol. 182

Global in time Strichartz inequalities on asymptotically flat manifolds with temperate trapping

J.-M. Bouclet, H. Mizutani

ISBN 978-2-85629-991-3
2024 - 107 pages - Softcover. 17 x 24
Public: 43 € - Members: 30 €

We prove global Strichartz inequalities for the Schrödinger equation on a large class of asymptotically conical manifolds. We show first that the low frequency part of any solution of the homogeneous Schrödinger equation enjoys the same global Strichartz estimates as on the Euclidean space of dimension at least 3. We also show that the high energy part also satisfies global Strichartz estimates without loss of derivatives outside a compact set, even if the manifold has trapped geodesics but in a temperate sense. We then show that the full solution satisfies global space-time Strichartz estimates if the trapped set is empty or sufficiently filamentary, and we derive a scattering theory for the L2 critical nonlinear Schrödinger equation in this geometric framework.

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Vol. 181

Complexes de modules équivariants sur l'algèbre de Steenrod associés à un $(Z/2)^n$-CW-complexe fini

D. Bourguiba, J. Lannes, L. Schwartz, S. Zarati

ISBN 978-2-85629-996-8
2024 - 139 pages - Softcover. 17 x 24
Public: 42 € - Members: 29 €

Soient V un 2-groupe abélien élémentaire et X un V-CW-complexe fini. Dans ce mémoire nous étudions deux complexes coaugmentés de modules sur A, l'algèbre de Steenrod modulo 2, munis d'une action compatible de H^*V, la cohomologie modulo 2 de V, complexes tous deux associés à X. Le premier, (« complexe topologique »), est défini à l'aide de la filtration par les orbites de X. Le second, (« complexe algébrique »), est défini en termes de la structure de H^*V-A-module instable dont est munie $H^*_V X$, la cohomologie modulo 2 équivariante de X. Nous construisons en outre un morphisme κ du complexe algébrique vers le complexe topologique. Nous montrons en particulier que ces deux complexes coaugmentés sont acycliques si et seulement si $H^*_V X$ est libre comme H^*V-module. Dans ce cas κ est un isomorphisme.



Vol. 180

Conformally invariant differential operators on Heisenberg groups and minimal representations

J. Frahm

ISBN 978-2-85629-986-9
2024 - 148 pages - Softcover. 17 x 24
Public: 47 € - Members: 33 €

For a simple real Lie group G with Heisenberg parabolic subgroup P, we study the corresponding degenerate principal series representations. For a certain induction parameter the kernel of the conformally invariant system of second order differential operators constructed by Barchini, Kable and Zierau is a subrepresentation which turns out to be the minimal representation. To study this subrepresentation, we take the Heisenberg group Fourier transform in the non-compact picture and show that it yields a new realization of the minimal representation on a space of L^2-functions. The Lie algebra action is given by differential operators of order ≤3 and we find explicit formulas for the functions constituting the lowest K-type. These L^2-models were previously known for the groups $SO_{(n,n)}$, $E_{6(6)}$, $E_{7(7)}$ and $E_{8(8)}$ by Kazhdan and Savin, for the group $G_{2(2)}$ by Gelfand, and for the group $SL\tilde{}(3,R)$ by Torasso, using different methods. Our new approach provides a uniform and systematic treatment of these cases and also constructs new L^2-models for $E_{6(2)}$, $E_{7(-5)}$ and $E_{8(-24)}$ for which the minimal representation is a continuation of the quaternionic discrete series, and for the groups $SO\tilde{}_{(p,q)}$ with either p≥q=3 or p,q≥4 and p+q even. As a byproduct of our construction, we find an explicit formula for the group action of a non-trivial Weyl group element that, together with the simple action of a parabolic subgroup, generates G.



Vol. 179

Ellipsitomic associators

D. Calaque, M. Gonzalez

ISBN 979-8-85629-981-4
2023 - 79 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.

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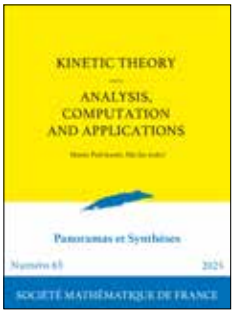
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Panoramas et Synthèses

The series **Panoramas et Synthèses** *is designed to introduce non-specialist mathematicians to new developments of contemporary mathematical research, with a special focus on the quality of exposition.*

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Vol. 65

Kinetic theory : analysis, computations and applications

M. Pulvirenti, S. Jin (eds.)

ISBN 978-2-37905-222-4
2025 - 263 pages - Softcover. 17 x 24
Public: 66 € - Members: 46 €

This volume covers subjects related to the mini-courses delivered during the winter school held at CIRM, Marseille-Luminy, France, from 18-22 January 2021. It formed part of the extensive program “Kinetic Theory: Analysis, Computation and Applications” organized at CIRM from January to June 2021, with Shi Jin as the Jean-Morlet Chair and Mihai Bostan as the Local Project Leader. Kinetic equations play an indispensable role in bridging the microscopic scales at the molecular level with the macroscopic scales at the continuum level. Macroscopic fluid flow equations can be derived from mesoscopic kinetic equations or even from microscopic interacting particle systems. This is one of the core areas of partial differential equations and mathematical physics, with a wide range of applications in astronautics, astrophysics, plasma physics, biology, and even the social sciences. This book provides a comprehensive overview of current activity in some of the most important topics of investigation in the field, including collective dynamics, fluid-dynamic limits, mean-field limits, and multiscale numerical methods.



Vol. 64

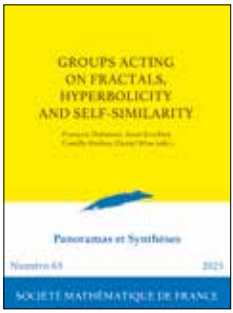
Central sheaves on affine flag varieties

P. N. Achar, S. Riche

ISBN 978-2-37905-216-3
2025 - 347 pages - Softcover. 17 x 24
Public: 79 € - Members: 55 €

In this book we explain the construction (due to Gaitsgory) of the «central sheaves» on the affine flag variety of a reductive algebraic group associated with the representations of the Langlands dual group. These objects are the categorical counterpart of the Bernstein description of the center of the affine Hecke algebra. They play a crucial role in many constructions related to the geometric Langlands program, some of which have important applications to the representation theory of reductive algebraic groups and associated quantum groups. We also explain the proof of the main properties of these objects (in particular the filtration by Wakimoto sheaves), for arbitrary coefficients. Finally, we present in detail the construction of an equivalence of categories due to Arkhipov-Bezrukavnikov relating certain derived categories of constructible sheaves on the affine flag variety and coherent sheaves on the Springer resolution of the dual group, in which central sheaves play a key role.

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Vol. 63

Groups acting on fractals, hyperbolicity and self-similarity

F. Dahmani, A. Erschler, C. Horbez, D. Wise (eds.)

ISBN 978-2-37905-215-6
2025 - 216 pages - Softcover. 17 x 24
Public: 59 € - Members: 41 €

This volume collects the lecture notes of the mini-courses given during the special trimester *Groups Acting on Fractals, Hyperbolicity and Self-Similarity*, held at the Institut Henri Poincaré in April-July 2022. Its guiding principle was fractalness in group theory, articulated around three main topics: self-similar groups acting on rooted trees, hyperbolic groups and their boundaries, and automorphism groups of free groups and surface groups. We hope this collection of mini-courses will highlight the rich and fruitful interactions between these topics, and provide a resource for a renewed community of researchers in the field.



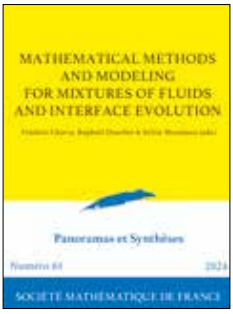
Vol. 62

Diophantine problems: determinism, randomness and applications

D. Kreso, J. Rivat, R. F. Tichy (eds.)

ISBN 978-2-37905-205-7
2024 - 216 pages - Softcover. 17 x 24
Public: 54 € - Members: 38 €

This volume features eight papers from the Jean Morlet Chair Program 2020/2021 titled «Diophantine problems: Determinism, Randomness, and Applications.» Aistleitner et al. investigate equidistribution and discrepancy theory using probabilistic methods, broadening classical findings in Fourier analysis. Kreso and Tichy, along with Heintze, explore polynomial variants of classical Pillai's Diophantine results. Pakovich studies Ritt's theory on rational functions, while Drmota et al. survey recent work on the Sarnak conjecture. Rossi et al. explore new directions in arithmetic dynamical systems. Ökten surveys quasi-random numbers and applications in numerical integration, and Nachbagauer and Thonhauser address option pricing in mathematical finance using quasi-Monte Carlo integration methods.



Vol. 61

Mathematical methods and modeling for mixtures of fluids and interface evolution

F. Charve, R. Danchin et S. Monniaux (eds.)

ISBN 978-2-85629-987-6
2024 - 106 pages - Softcover. 17 x 24
Public: 42 € - Members: 29 €

This volume includes the lecture notes of the three mini-courses that have been given during the CIRM-SMF week entitled *Inhomogeneous Flows: Asymptotic Models and Interfaces Evolution* that took place at the CIRM from September 23 to September 27, 2019. The conference followed the themes of the ANR-15-CE40-0011 INFAMIE project and aimed at bringing together experts coming from various branches of mathematical fluid dynamics and interested in inhomogeneous fluids where problems of interfaces occur. Beside the mini-courses, the event comprised 14 plenary talks that were specifically dedicated to inhomogeneous flows. The mini-courses emphasized on the one hand theoretical approaches that proved to be efficient in the study of evolutionary fluid mechanics (maximal regularity issues in the notes of P. Kunstmann with stress on the L^1-in-time estimates that turn out to be crucial in the study of free boundary problems, and the prospective course by P. Auscher on tent spaces), and on the other hand the modeling aspect with the lectures by S. Gavrilyuk devoted to the derivation of models of bi-fluids by means of Hamiltonian principle. The originality of these texts is that they have been written conjointly by the speaker and young participants, from the notes that have been taken during the courses.

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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 - 171 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.



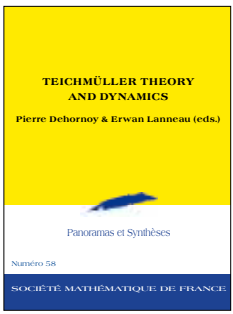
Vol. 59

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 at 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 - 143 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.

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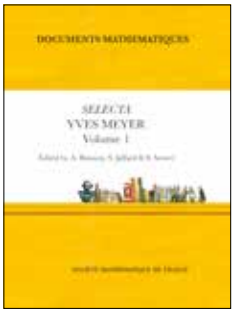
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Vol. 22
Selecta - Yves Meyer
A. Bonami, S. Jaffard, S. Seuret (eds.)

ISBN 978-2-85629-992-0
2025 - 353 pages - Hardcover. 17 x 24
Public: 79 € - Members: 55 €

The scientific achievements of Yves Meyer, especially his role in the birth and elaboration of wavelet theory, have been eminently publicized, when he received the Gauss and the Abel prizes. These Selecta enlighten his whole legacy, whose diversity and deepness characterize his scientific trajectory, leading to the development of wavelets. The reader will find in these three books a substantial and representative part of the articles by Yves Meyer, and original texts by other authors that illustrate his evolution and explain the consistence of his work. The first volume contains articles in harmonic analysis, in relation with number theory and their interplay with crystallography. Besides these ones, Volume 1 gathers contributions by V. Berthé & R. Yassawi, D. Gratias & M. Quiquandon, R. Moody, A. Olevskii & A. Ulanovskii, and an original paper by Y. Meyer himself.



Vol. 21
Résidus et dualités, prénotes pour un « Séminaire Hartshorne »
A. Grothendieck, édité par R. Hartshorne

ISBN 978-2-85629-983-8
2024 - 165 pages - Hardcover. 17 x 24
Public: 47 € - Members: 33 €

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.

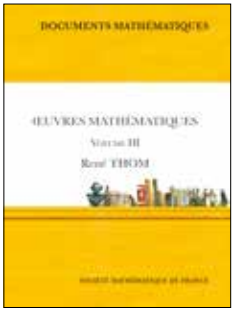
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Vol. 20
Pursuing Stacks (volume I)
A. Grothendieck, édité par G. Maltsiniotis

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.

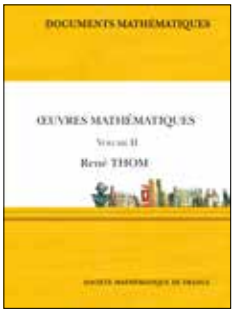


Vol. 18
Rational Points on Curves over finite fields
J-P. Serre, with contributions by E. Howe, J. Oesterlé and C. Ritzenthaler

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.

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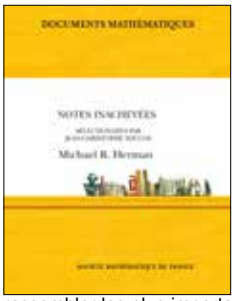


Vol. 17

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.

Previous titles published in this series

Œuvres mathématiques de René Thom (Volume I)
ISBN 978-2-85629-816-9
DM15 - 2017 - 573 pages
Public: 78 € - Members: 55 €

P. Colmez, J-P. Serre (éds.) - Correspondance Serre-Tate (volumes I & II)
ISBN 978-85629-802-2 ; 978-85629-803-9
DM13, DM14 - 2015 - 969 pages - Public: 80 € - Members: 56 € (each)
Public: 140 € - Members: 98 € (two volumes) - ISBN 978-85629-808-4

J. Tits - Résumés des cours au Collège de France (1973 - 2000)
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DM12 - 2013 - 390 pages - Public: 98 € - Members: 68 €

L. Schwartz - Œuvres scientifiques (I) (II) (III)
ISBN 978-285629-317-1 ; 978-285629-318-8 ; 978-285629-319-5
DM9-10-11 - 2011 - 1649 pages - Public: 79 € - Members: 55 € (each)
Public: 216 € - Members: 151 € (three volumes with a free DVD) - ISBN 978-2-85629-337-9

M. Demazure, A. Grothendieck - Schémas en groupes, (SGA 3, Tome III) - Structure des schémas en groupes réductifs - Séminaire de Géométrie Algébrique du Bois Marie 1962-1964
ISBN 978-2-85629-324-9
DM8 - 2011 - 337 pages - Public: 68 € - Members: 47 €

More information and other titles available: smf.emath.fr

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Cours Spécialisés

The series **Cours Spécialisés [Specialized Courses]** *is dedicated to lecture notes for graduate students or young researchers. It covers all fields of mathematics.* (ISSN 1284-6090)

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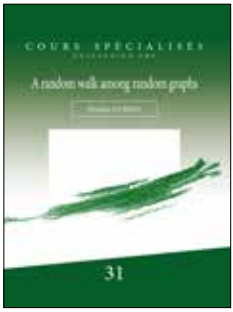
Vol. 32

Microlocal analysis in hyperbolic dynamics and geometry

T. Lefeuvre (avec une contribution de Y. Chaubet)

ISBN 978-2-37905-221-7
2025 - 550 pages - Hardcover. 17 x 24
Public: 93 € - Members: 65 €

The statistical properties of hyperbolic dynamical systems - such as ergodicity and mixing - can be studied through spectral theory, in particular via anisotropic Sobolev spaces of distributions. In settings where the geodesic flow exhibits hyperbolic features, rigidity phenomena in Riemannian geometry - showing that certain spectral or geometric invariants determine the underlying geometry - can likewise be addressed using microlocal analysis. This book offers a comprehensive introduction to microlocal analysis and its applications to hyperbolic dynamics and Riemannian rigidity. It is intended for graduate students and researchers seeking to familiarize themselves with these powerful techniques.



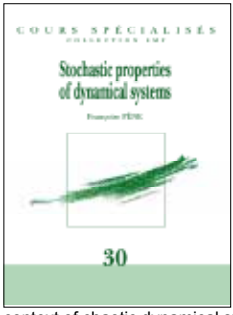
Vol. 31

A random walk among random graphs

N. Curien

ISBN 978-2-37905-212-5
2025 - 199 pages - Hardcover. 17 x 24
Public: 59 € - Members: 41 €

Random graphs now stand at the forefront of modern probability and statistics, serving as powerful tools for modeling complex systems across disciplines. This course, tailored for Master's and PhD students, offers a rigorous and insightful introduction to the foundational models of random graph theory - among them the Bienaymé-Galton-Watson trees, the Erdos-Rényi graph, and preferential attachment models such as the Barabási-Albert graph. We present short and modern proofs of landmark results, including the emergence of a giant component in Erdos-Rényi graphs and the asymptotic behavior of distances and degree distributions in preferential attachment networks. Special emphasis is placed on the core probabilistic techniques that drive these analyses - such as the method of moments, random walk theory, and Poissonization - equipping students with versatile tools that apply far beyond the scope of this course.



Vol. 30

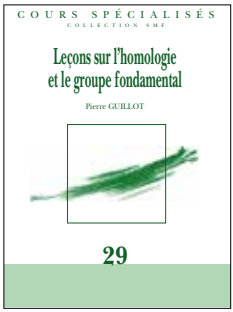
Stochastic properties of dynamical systems

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.

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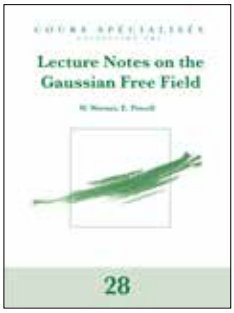
Vol. 29

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≥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 cohomologie.
- L'espace des cycles compacts d'une variété Kählérienne est Kählérien.

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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 XVI^{e} 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.

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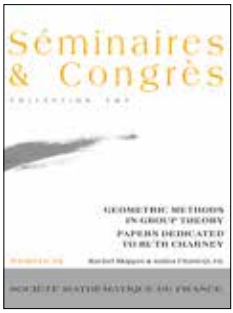
D. Li, H. Queffélec - Introduction à l'étude des espaces de Banach - Analyse et Probabilités
ISBN 978-2-85629-155-9
CS12 - 2004 - 627 pages - Public: 44 € - Members: 31 €

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Séminaires et Congrès

Séminaires et Congrès [Seminars and Conferences] *is a book series aimed at student and professional mathematicians. It covers all fields of mathematics. Volumes are proceedings of conférences.* (*ISSN 1285-2783*)



Vol. 34

Geometric methods in group theory: papers dedicated to Ruth Charney

R. Skipper, I. Chatterji (eds.)

ISBN 978-2-85629-998-2
2025 - 316 pages - Softcover. 17 x 24
Public: 62 € - Members: 43 €

In this volume are gathered the proceedings of one of the first hybrid conferences in geometric group theory, which brought together two conferences cancelled following the Covid-19 pandemic. One was in honor of Ruth Charney, and the other was a workshop on generalizations of hyperbolicity, a theme that benefited greatly from the influence of Ruth Charney. The articles in this volume reflect the organizers' goals of making geometric group theory accessible and open to all, and this volume can be seen as a capsule of questions and answers that this part of the community was asking itself in the summer of 2021.



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..



Vol. 32

Spectral theory of graphs and of manifolds - CIMPA 2016 Kairouan, Tunisia

C. Anné and N. 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 introduction 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.

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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 variationnelles 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 changement 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.

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SC26 - 2013 - 279 pages - Public: 47 € - Members: 33 €

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SC22 - 2011 - 174 pages - Public: 45 € - Members: 32 €

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ISBN 978-2-85629-279-2
SC21 - 2011 - Public: 45 € - Members: 32 €

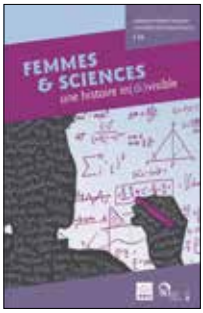
Luminy 2006 : École de théorie ergodique - Y. Lacroix, P. Liardet, J.-P. Thouvenot, éds.
ISBN 978-2-85629-312-6
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Dynamical Systems and Diophantine Approximation - Y. Bugeaud, F. Dal'bo, C. Drutu, eds.
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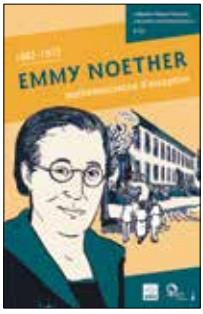
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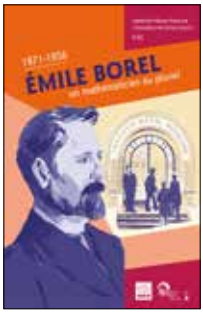
Ce fascicule dévoile des portraits de femmes de sciences d'hier et d'aujourd'hui. Partie intégrante de l'histoire des sciences, elles ont souvent été invisibilisées. Quelles en sont les raisons ? Quels freins rencontrent les femmes pour se tourner vers les sciences aujourd'hui ? Qui sont ces scientifiques ? C'est un voyage à travers le temps et l'espace, à la rencontre des sciences au féminin que ce livret propose.



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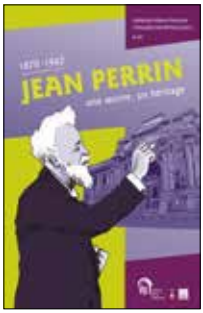
À une époque où les femmes avaient difficilement accès à l'université, Emmy Noether (1882-1935) parvint à influencer toute une génération de mathématiciens et mathématiciennes et laisse une empreinte fondamentale sur les mathématiques. Ce fascicule permet de découvrir la vie de cette scientifique hors norme dont les théorèmes ont marqué la physique mathématique et à qui l'on doit la fondation de l'algèbre moderne !



Émile Borel, un mathématicien au pluriel
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ISBN 978-2-85629-962-3
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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
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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 XX^{e} 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.

Books out of series



Jean-Pierre Demailly

ISBN 978-2-37905-213-2
2025 - 84 pages - Softcover. 21 x 27
Public: 25 € - Members: 18 €

Jean-Pierre Demailly était un mathématicien hors pair, qui nous a quité prématurément en mars 2022. Ce volume lui rend hommage au travers de cinq textes mathématiques passant en revue une partie significative de ses contributions fondamentales à l'analyse complexe et à la géométrie analytique, différentielle et algébrique complexe. Il regroupe également des témoignages de collègues et amis de Jean-Pierre, évoquant notamment ses multiples passions et engagements.



Ateliers clefs en main

ISBN 978-2-85629-995-1
2024 - 96 pages - Softcover. 21 x 27
Public: 25 € - Members: 18 €

La SMF a décidé d'éditer ce numéro spécial afin de contribuer à la circulation, à l'échange et à la valorisation des travaux de diffusion des collègues. Les auteur-ices de ce volume ont répondu à un appel à contribution réalisé dans la Gazette d'avril 2022. Bien qu'une durée et un niveau sont indiqués pour chaque article, les ateliers sont très modulables à la fois en durée et en niveau. Le présent ouvrage a été pensé indépendamment et simultanément au site Kits mathématiques (kits.math.cnrs.fr) avec lequel une symbiose s'est créée rapidement et naturellement. Pour chaque atelier, un QR code en fin d'article permet d'accéder au matériel mis à disposition sur Kits Maths.



Pour la parité en sciences

ISBN 978-2-85629-989-0
2024 - 172 pages - Softcover. 21 x 27
Public: 30 € - Members: 21 €

Ce livre, fruit d'une collaboration entre femmes & mathématique et la SMF a pour but de présenter au public francophone les résultats du projet triennal (2017-2019), financé par le Conseil international des sciences, avec la participation de onze organisations scientifiques partenaires, dont l'Union mathématique internationale et le Conseil international des mathématiques industrielles et appliquées ainsi que l'Unesco. L'objectif principal du projet était d'étudier les inégalités femmes-hommes dans les disciplines scientifiques de ces organisations sous différents angles, à l'échelle mondiale.

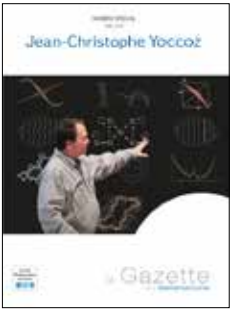
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La Gazette des 150 ans

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-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.



Lectures grothendieckiennes

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 €

Ce livre 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 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
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.

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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
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 françcais. 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.

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