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## BULLETIN BIBLIOGRAPHIQUE

Arnold Buffum CHACE. — **The Rhind mathematical papyrus.** — Un vol. relié, 28,5 × 22,5, de 160 p. — The National Council of Teachers of Mathematics, Reston, Virginia 22091, USA, 1979.

Le Papyrus Rhind est l'un des plus anciens traités de mathématiques connus : il date de 1650 avant notre ère et il est lui-même la copie d'un texte des années 1850-1800 av. J.C..

Ce Papyrus a été découvert à Luxor par Henry Rhind en 1858. Il est actuellement conservé au British Museum et reste notre principale source de connaissances des mathématiques de l'Ancienne Egypte. Le document se présente sous la forme d'un rouleau d'environ 30 cm de large sur 6 m de long. Il est écrit en hiératique, qui est la forme cursive de l'écriture hiéroglyphique.

C'est une reproduction photographique du Papyrus qui constitue le centre de l'ouvrage d'Arnold Buffum Chace, *The Rhind Mathematical Papyrus*, édité en 1979. Après quelques instants d'émotion passés à contempler les photographies, le lecteur peut suivre la longue étude qui les accompagne, et dont les étapes sont les suivantes :

- 1) Reproduction à plus grande échelle de l'écriture hiératique du scribe.
- 2) Transcription de cette écriture en hiéroglyphes.
- 3) Remplacement des hiéroglyphes par des consonnes de notre alphabet.
- 4) Copie de gauche à droite des consonnes, pour retrouver le sens de notre écriture.
- 5) Traduction mot à mot du texte obtenu.
- 6) Traduction libre plus intelligible.

Arnold Buffum Chace a ainsi accompli un travail considérable, mais je regrette un peu, personnellement, que cette édition en ait conservé la lettre plutôt que l'esprit : en effet, l'auteur a publié ses recherches sous la forme de deux volumes, parus en 1927 et 1929. Le premier volume comprend une étude approfondie des calculs, des unités de mesure et des connaissances géométriques des Egyptiens, ainsi que la traduction libre et commentée qui est la dernière étape que nous avons mentionnée. Le second volume présente les reproductions photographiques et, pour un très grand nombre de problèmes, les cinq premières étapes de la traduction.

La pensée d'Arnold Buffum Chace aurait-elle été trahie si, au lieu de relier les deux volumes l'un après l'autre, l'éditeur, The National Council of Teachers of Mathematics, avait pris l'initiative de réunir, pour chaque problème, la sixième étape aux cinq premières ? Je pense qu'au contraire le lecteur aurait alors bénéficié d'une vue plus complète de la méthode qui nous a rendu le Papyrus Rhind accessible.

Quelles sont les connaissances des Anciens Egyptiens que nous révèle le Papyrus ?

- Les Egyptiens connaissaient deux sortes de nombres:
- une série croissante de 1 à 1 000 000,
  - une série décroissante, composée de  $2/3$  et de  $1/2, 1/3, 1/4, \dots$

Des combinaisons des nombres des deux séries étaient possibles, les fractions devant toutes être différentes, et leur somme étant presque toujours inférieure à l'unité. Les Egyptiens multipliaient presque toujours par duplications successives, et effectuaient leurs divisions par essais. Ils utilisaient cependant des méthodes spéciales pour écrire, avec les seules fractions qu'ils connaissaient, les résultats des opérations: le procédé le plus fréquent consistait à rechercher certaines parts d'un nombre qui était choisi pour faciliter les calculs.

C'est cette même méthode que l'on retrouve employée dans la résolution des problèmes du Papyrus, et qui est connue sous le nom de « fausse position »: les Egyptiens étudiaient leur problème pour un certain nombre, puis ils cherchaient la relation existant entre ce nombre et la solution, ce qui leur permettait de calculer cette dernière.

Le Papyrus nous a également permis de connaître les unités de mesure des Egyptiens et de comprendre comment ils effectuaient leurs calculs d'aires, de volumes, ainsi que quelques résolutions de pyramides, où la trigonométrie émet ses premiers balbutiements. Retenons une bonne valeur approchée de l'aire du disque, correspondant à la formule:

$$(d - \frac{1}{9}d)^2$$

où  $d$  est le diamètre, et qui revient pour nous à utiliser une valeur de  $\pi$  voisine de 3,16.

Le National Council of Teachers of Mathematics suggère dans son avertissement au lecteur quelques utilisations possibles de l'ouvrage dans l'enseignement:

« On peut acquérir une bonne pratique de l'arithmétique en résolvant des problèmes par la méthode de la fausse position, et une bonne intuition algébrique en déterminant quels sont les types d'équations linéaires pour lesquelles la méthode donne des résultats valables. Evaluer la précision du calcul de l'aire du disque par les Anciens Egyptiens peut engendrer un excellent échange de vues sur la nature de  $\pi$ , d'une démonstration, d'une valeur approchée, de l'origine des idées dans le domaine mathématique, et sur l'évolution et la nature grandissante des mathématiques elles-mêmes.»

Appel qui sera, espérons-le, entendu par tous. (*Analyse de Jean CESAR.*)

Susan MONTGOMERY. — **Fixed rings of finite automorphism groups of associative rings.** — Lecture Notes in Mathematics, vol. 818. — Un vol. broché, 16,5 × 24, de viii, 126 p. — Prix: DM 18.00. — Springer-Verlag, Berlin/Heidelberg/New York, 1980.

Preliminaries. — Rings with no  $|G|$ -torsion: existence of fixed elements, the prime radical and Jacobson radical of  $R^G$ . — Simple rings: inner and outer automorphisms, simple fixed rings,  $R$  as an  $R^G$ -module. — Inner and outer automorphisms of semi-prime rings. — Rings with no nilpotent elements: existence of fixed elements and traces. — Chain conditions. — Polynomial identities. — Skew group rings and applications to modules.

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*Power in voting bodies*: The Shapley-Shubik index of voting power. Weighted voting bodies. The power of voting blocs. Committees. Decisions made by two or more voting bodies. — *Voting methods for more than two alternatives*: The weaknesses of sequential pairwise voting. Plurality voting. Plurality elimination procedures. The Borda count. Condorcet voting methods. Results of the axiomatic approach. Application to environmental decision making in the Bow River Valley. Application to multi-objective decisions by a single decision-maker. — *Recent approaches to voting using intensities of preference*: Cardinal utility. Approval voting. Voting by bids. Vickrey's scheme for sealed bidding. A preference revealing process: the Clarke tax. Problems with implementing the preference revealing process. Conclusions. — *Answers to selected problems*.

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an industrial perspective. — **EXPERIENCES:** *R. A. Snowdon* : An experience-based assessment of development systems. — **DEVELOPMENT SUPPORT SYSTEMS:** *L. J. Osterweil* : A software lifecycle methodology and tool support. — *A. I. Wasserman* : Software tools and the user software engineering project. — **PROCEDURAL DESCRIPTION TECHNIQUES:** *B. Leavenworth* : The use of data abstraction in program design. — *W. E. Riddle* : Procedural approaches to software design modelling. — **NON-PROCEDURAL DESCRIPTION TECHNIQUES:** *A. C. Shaw* : Software specification languages based on regular expressions. — *J. M. Smith and D.C.P. Smith* : A data base approach to software specification. — **ANALYSIS TOOLS:** *R. L. London and L. Robinson* : The role of verification tools and techniques. — *R. E. Fairley* : Software validation and pre-implementation issues. — **SUMMARY.**

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*A review of basic statistical techniques* : Descriptive statistics. Probability distributions. Basic statistical inference. — *Regression analysis* : Introduction. Transformations to linear form. Multiple regression. Curvilinear regression. Examination of residuals. Use of computers. — *Design and analysis of experiments* : Introduction. One-way classification. Two-way classification without replication. Two-way classification with replication. Latin square design. Analysis of covariance. Factorial designs with factors at two levels. Use of computers. — *Nonparametric methods* : Introduction. One sample location test. Two matched samples location tests. Two independent samples location test.  $k$  independent samples location test. Two independent samples dispersion test. Rank correlation methods. — *Sampling inspection and quality control* : Introduction. Batch inspection. Continuous production inspection. — *Sample surveys* : Introduction. Simple random sampling. Stratified populations. Presentation and analysis of sample survey results. — *Forecasting* : Introduction. Decomposition of a time series. Long term forecasting. Adaptive forecasting. Further short term forecasting techniques.

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*Introduction* : Basic concepts. Special cases of disjunctive programs and their applications. — *Basic concepts and principles* : Surrogate constraints. Pointwise-supremal cuts. Basic disjunctive cut principle. — *Generation of deep cuts using the fundamental disjunctive inequality* : Defining suitable criteria for evaluating the depth of a cut. Deriving deep cuts for *DC1*. Deriving deep cuts for *DC2*. Other criteria for obtaining deep cuts. Some standard choices of surrogate constraint multipliers. — *Effect of disjunctive statement formulation on depth of cut and polyhedral annexation techniques* : Illustration of the tradeoff between effort for cut generation and the depth of cut. Some general comments with applications to the generalized lattice point and the linear complementarity problem. Sequential polyhedral annexation. A supporting hyperplane scheme for improving edge extensions. Illustrative example. — *Generation of facets of the closure of the convex hull of feasible points* : A linear programming equivalent of the disjunctive program. Alternative characterization of the closure of the convex hull of feasible points. Generation of facets of the closure of the convex hull of feasible points. Illustrative example. Facial disjunctive programs. — *Derivation and improvement of some existing cuts through dis-*

*junctive principles*: Gomory's mixed integer cuts. Convexity or intersection cuts with positive edge extensions. Reverse outer polar cuts for zero-one programming. — *Finitely convergent algorithms for facial disjunctive programs with applications to the linear complementarity problem*: Principal aspects of facial disjunctive programs. Stepwise approximation of the convex hull of feasible points. Approximation of the convex hull of feasible points through an extreme point characterization. Specializations of the extreme point method for the linear complementarity problem. — *Some specific applications of disjunctive programming problems*: Some examples of bi-quasiconcave problems. Load balancing problem. The segregated storage problem. Production scheduling on  $N$ -identical machines. Fixed charge problem. Project selection/portfolio allocation/goal programming. Other applications.

Jürgen WOLTERS. — **Stochastic dynamic properties of linear econometric models.** — Lecture Notes in Economics and Mathematical systems, vol. 182. — Un vol. broché, 16,5 × 24, de VIII, 154 p. — Prix: DM 28.00. — Springer-Verlag, Berlin/Heidelberg/New York, 1980.

*The linear dynamic econometric model*: Introduction. Structural, reduced and final form. Solutions of the model. — *Spectral representation of the linear dynamic model with constant coefficients*: Derivation of the spectral matrix. Numerical approaches. An example: effects of residuals. Spectral matrix in unstable models. — *Spectral representation of a linear dynamic econometric model with stochastic coefficients*: Methodological approach. Effects of alternative estimation methods on the dynamic properties of an aggregated demand model of the FRG. Empirical spectral analysis. — *Effects of exogenous variables on the cyclic properties of an econometric model*: Introduction. Dynamic properties of an aggregated model of the FRG. Stabilization policies. — *Summary*.

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The linear sum assignment problem. The linear bottleneck assignment problem. The cardinality matching problem. The sum matching problem. The bottleneck matching problem. The Chinese postman problem. Quadratic assignment problems. *QAP* heuristic 1: the method of increasing degree of freedom. *QAP* heuristic 2: cutting plane and exchange method. General subroutines.

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*Introduction*. — *Optimization methods*: Line-search algorithms. Quadratic programming. Unconstrained optimization. Penalty methods. Multiplier methods. Quadratic approximation methods. Generalized reduced gradient methods. The method of Robinson. — *Optimization programs*: Program organization. Description of the programs. — *The construction of test problems*: Fundamentals of the test problem generator. General test problems. Linearly constrained test problems. Degenerate test problems. Ill-con-

ditioned test problems. Indefinite test problems. Convex test problems. — *Performance evaluation*: Notations. Efficiency, reliability, and global convergence. Performance for solving degenerate, *ill*-conditioned and indefinite problems. Sensitivity to slight variations of the problem. Sensitivity to the position of the starting point. Ease of use. How to get a final score. — *Conclusions, recommendations, remarks*: Final conclusions. Recommendations for the design of optimization programs. Some technical details. — *Appendices*: Numerical data for constructing test problems. Sensitivity analysis for the test problems. Further results. Evaluation of significance factors.

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**FIBRES VECTORIELS:** *A. van de Ven*: Twenty years of classifying algebraic vector bundles. — *Robin Hartshorne*: Four years of algebraic vector bundles: 1975-1979. — *Wolf Barth*: Kummer surfaces associated with the Horrocks-Mumford bundle. — **PÉRIODES DES VARIÉTÉS ALGÉBRIQUES:** *James A. Carlson and Phillip A. Griffiths*: Infinitesimal variations of Hodge structure and the global Torelli problem. — *James A. Carlson, Eduardo H. Cattani and Aroldo G. Kaplan*: Mixed Hodge structures and compactifications of Siegel's space. — *James A. Carlson*: Extensions of mixed Hodge structures. — *A. Conte and J. P. Murre*: The Hodge conjecture for Fano complete intersections of dimension four. — *Ron Donagi and Roy Smith*: The degree of the Prym map onto the moduli space of five dimensional abelian varieties. — *Frans Oort and Joseph Steenbrink*: The local Torelli problem for algebraic curves. — **SURFACES:** *Arnaud Beauville*: Sur le nombre maximum de points doubles d'une surface dans  $P^3$  ( $\mu(5) = 31$ ). — *S. Bloch*: On an argument of Mumford in the theory of algebraic cycles. — *J.-L. Colliot-Thelene et J. Sansuc*: La descente sur les variétés rationnelles. — *Yoichi Miyaoka*: On the Mumford-Ramanujam vanishing theorem on a surface. — *C. A. M. Peters*: On automorphisms of compact Kähler surfaces. — **VARIÉTÉS DE DIMENSION 3:** *Yujiro Kawamata*: A characterization of an abelian variety. — *Miles Reid*: Canonical 3-folds. — *Kenji Ueno*: Birational geometry of algebraic threefolds.

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*S. Albeverio, Ph. Blanchard and R. Høegh-Krohn*: Feynman path integrals, the Poisson formula and the theta function for the Schrödinger operators. — *J. F. G. Auchmuty*: Models of rotating self-gravitating liquids. — *T. Brooke Benjamin*: Theoretical problems posed by gravity-capillary waves with edge constraints. — *B. Bojarski*: Analytical and geometrical properties of generalized potentials. — *G. Capriz and P. Podio-Guidugli*: Questions of uniqueness in finite elasticity. — *C. M. Dafermos*: The equations of elasticity are special. — *J. Glimm, D. Marchesin and O. McBryan*: The Buckley-Leverett equation: theory, computation and application. — *G. A. Hagedorn*: Semiclassical quantum mechanics II: the large mass asymptotics for coherent states. — *A. Haraux*: Behaviour at infinity for dissipative systems with forcing term in Hilbert space. — *G. Iooss*: The behaviour of solutions lying on an invariant 2-torus arising from the bifurcation of a periodic solution. — *K. Kirchgässner and J. Scheurle*: Bifurcation from the continuous spectrum and singular solutions. — *S. Klainerman*: Classical solutions to nonlinear wave equations and non-linear scattering. — *W. Kosinski*: Uniqueness theorems in dynamics of dissipative bodies with nonlinear material structures. — *T. P. Liu*: A system of quasi-linear hyperbolic partial differential equations. — *T. Nishida*: Asymptotic behaviour of solutions of the Boltzmann equation. — *J. E. Taylor*: Surface tension functions and their surfaces of least energy. — *R. Témam*: Variational problems of plasticity. — *A. Van derbauwhede*: Hopf bifurcation for abstract nonlinear equations.

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*Basic concepts*: Basic elements. Decision rules and risk. Randomized decision rules. Decision principles. Foundations. Sufficient statistics. Convexity. — *Utility and loss*: Utility theory. The utility of money. The loss function. Criticisms. — *Prior information and subjective probability*: Subjective probability. Prior information. Criticisms. The statistician's role. — *Bayesian analysis*: The posterior distribution. Bayesian inference. Bayesian decision theory. Admissibility of Bayes and generalized Bayes rules. Robust-

ness of Bayes rules. Conclusions. — *Minimax analysis*: Game theory. Statistical games. Evaluation of the minimax principle. — *Invariance*: Formulation. Location parameter problems. Other examples of invariance. Maximal invariants. Invariance and non-informative priors. Invariance and minimaxity. Admissibility of invariant rules. Conclusions. — *Preposterior and sequential analysis*: Optimal fixed sample size. Sequential analysis-notation. Bayesian sequential analysis. The sequential probability ratio test. Minimax sequential procedures. Discussion of sequential analysis. — *Complete and essentially complete classes*: Complete and essentially complete classes from earlier chapters. One-sided testing. Monotone decision problems. Limits of Bayes rules. Other complete and essentially complete classes of tests. Continuous risk functions. Stein's necessary and sufficient condition for admissibility. — *Appendices*: Common statistical densities. Technical arguments. — Exercices à la fin de chaque chapitre.

**Abstract Cauchy problems and functional differential equations.** — Proceedings of the Workshop on functional-differential equations and nonlinear semigroups held at the Volksbildungsheim Schloss Retzhof, June 25-30, 1979. — Edited by F. Kappel and W. Schappacher. — Research notes in mathematics, vol. 48. — Un vol. broché, 16,5 × 24, de 238 p. — Prix: £9.50. — Pitman advanced publishing program, Boston/London/Melbourne, 1981.

*V. Barbu*: A semigroup approach to an infinite delay equation in Hilbert space. — *H. Jeggel*: A general framework for the approximation of semi-groups of nonlinear operators. — *K. Kunisch*: A semigroup approach to partial differential equations with delay. — *K. G. Magnusson and A. J. Pritchard*: Local controllability for nonlinear evolution equations. — *R. H. Martin, Jr.*: Asymptotic behavior of solutions to a class of quasimonotone functional differential equations. — *J. Mawhin*: Monotonicity and two point boundary value problems for nonlinear second order differential equations in Hilbert spaces. — *C. Picard*: Nonlinear variational inequalities and nonlinear potential theory. — *L. C. Piccinini*:  $G$ -convergence and evolution problems. — *M. Pierre*: Evolution equations with irregular obstacles. — *W. Schappacher*: Translation semigroups and functional differential equations. — *Klaus Schmitt*: Oscillations in nonlinear delay equations. — *R. Villella-Bressan*: Flow invariant sets for functional differential equations. — *H. O. Walther*: Delay equations: instability and the trivial fixed point's index.

Erich LAMPRECHT. — **Lineare algebra I.** — Uni-Taschenbücher, vol. 1021. — Un vol. broché, 12 × 18,5, de ix, 231 p. — Prix: FS 19.80. — Birkhäuser Verlag, Basel/Boston/Stuttgart, 1980.

*K-Vektorräume und ihre Homomorphismen*: Algebraische Grundbegriffe. Die Modulstruktur von *K*-Vektorräumen. Lineare Unabhängigkeit, Vektorraumbasen. Linearformen, Bilinearformen, Dualität. — *K-Endomorphismen, Elementarteiler und Normalformenprobleme*: Algebraische Eigenschaften von *K*-Homomorphismen, *K*-Endomorphismen und zugeordneten Matrizen. Moduln über Hauptidealringen, Elementarteilersatz. Normalformen von Matrizen und Anwendungen. — Exercices pour chaque chapitre.

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*Part I*: Proceedings of the International colloquium of the CNRS held at Aix-en-Provence, September 3-7, 1979, edited by J. M. Souriau: Symplectic mechanics and the

calculus of variations: 5 exposés par F. J. Bloore, S. Benenti & W. M. Tulczyjew, W. M. Tulczyjew, C. Duval, P. A. Horvathy. — Geometric quantization: 7 exposés par J. M. Souriau, J. A. Wolf, J. H. Rawnsley, H. Hess, D. J. Simms, G. Kaiser, E. Onofri. — Deformations of Lie algebras: 2 exposés par A. Lichnerowicz, D. Arnal & J. C. Cortet. — Classical field theory: 3 exposés par J. Kijowski, A. Z. Jadczyk, H.-P. Künzle & J. R. Savage. — Supersymmetry and supergravity: 3 exposés par J. Lukierski, S. Ferrara, S. Deser. — *Part II*: Proceedings of the conference held at Salamanca, September 10-14, 1979, edited by P. L. Garcia and A. Perez-Rendon: Gauge theories: 7 exposés par R. Bott, V. Moncrief, P. L. Garcia, M. Carmeli & B. Z. Moroz, Y. Ne'eman & J. Thierry-Mieg, R. Kerner, R. N. Sen. — Quantization and symplectic structures: 6 exposés par A. Lichnerowicz, I. E. Segal, C. Günther, D. J. Simms, H. R. Petry, V. Guillemin & S. Sternberg. — General relativity: 4 exposés par S. Deser, A. Perez-Rendon, J. Kijowski, W. Kopczynski. — Classical field theory and analytical mechanics: 4 exposés par W. M. Tulczyjew, P. Dedecker & W. M. Tulczyjew, T. Szapiro, S. Benenti.

Josef MEIXNER, Friedrich W. SCHÄFKE, Gerhard WOLF. — **Mathieu functions and spheroidal functions and their mathematical foundations; further studies.** — Lecture notes in Mathematics, vol. 837. — Un vol. broché, 16,5 × 24 de vii, 126 p. — Prix: DM 18.00. — Springer-Verlag, Berlin/Heidelberg/New York, 1980.

*Introduction and preface.* — *Foundations*: Eigenvalue problems with two parameters. Simply separated operators. — *Mathieu functions*: Integral relations. Addition theorems. On the computation of the characteristic exponent. On the eigenvalues for complex  $h^2$ . Improved estimates of the radii of convergence. Asymptotic estimates for large  $h^2$ . On the power series of the eigenvalues. — *Spheroidal functions*: Integral with products of spheroidal functions. On the eigenvalues for complex  $\gamma^2$ . The spheroidal functions for  $\mu^2 = 1$ ,  $\lambda = 0$ . Applications and numerical tables. — Appendix.

**Global differential geometry and global analysis.** — Proceedings of the colloquium held at the Technical University of Berlin, November 21-24, 1979. — Edited by D. Ferus, W. Kühnel, U. Simon, and B. Wegner. — Lecture Notes in Mathematics, vol. 838. — Un vol. broché, 16,5 × 24, de xi, 299 p. — Prix: DM 34.50. — Springer-Verlag, Berlin/Heidelberg/New York, 1981.

*K. Leichtweiss* : E. B. Christoffels Einfluss auf die Geometrie. — *S. Alexander* : Distance geometry in Riemannian manifolds-with-boundary. — *D. Barthel, R. Kuemritz* : Laplacian with a potential. — *L. Berard Bergery, J. P. Bourguignon* : Laplacian and Riemannian submersions with totally geodesic fibres. — *R. Boehme* : A Plateau problem with many solutions for boundary curves in a given knot class. — *J. P. Bourguignon* : Ricci curvature and Einstein metrics. — *U. Brehm, W. Kuehnel* : Smooth approximation of polyhedral surfaces with respect to curvature measures. — *J. Bruening* : Invariant eigenfunctions of the Laplacian and their asymptotic distribution. — *P. Buser, H. Karcher* : The Bieberbach case in Gromov's almost flat manifold theorem. — *T. Cecil, P. Ryan* : Tight spherical embeddings. — *B. Y. Chen, L. Verstraelen* : Characterizations of space forms by hypersurfaces. — *J. Czyz* : On graded bundles and their geometry. — *A. Derdzinski* : Compact Riemannian manifolds with harmonic curvature and non-parallel Ricci tensor. — *M. P. Do Carmo* : Stability of minimal submanifolds. — *A. Gray* : A generalization of Weyl's tube formula. — *S. Helgason* : The X-ray transform on a symmetric space. — *H.-Ch. Im Hof* : Visibility, horocycles, and the Bruhat decomposition. — *S. Kobayashi* : On holomorphic connections. — *I. Kolar* : Fiber parallelism and connections. — *O. Kowalski* : Riemannian manifolds the geodesic balls of which are near to the Euclidean balls by volume. — *R. Langevin* : Tight foliations. — *L. Lemaire* : Minima and critical points of

the energy in dimension two. — *K. H. Mayer* :  $S^1$ -actions on almost complex manifolds. — *J. D. Moore* : On conformal immersions of space forms. — *V. Oliker* : Some remarks on elliptic equations and infinitesimal deformations of submanifolds. — *Z. Olszak* : The spectrum of the Laplacian and the curvature of Sasakian manifolds. — *T. Sunada* : Geodesics chains and the spherical mean operator. — *G. Tsagas* : The spectrum of the Laplace operator for a special complex manifold. — *J. C. Wood* : On the holomorphicity of harmonic maps from a surface. — *I. Bivens, J. P. Bourguignon, A. Derdzinski, D. Ferus, O. Kowalski, T. Klotz Milnor, V. Oliker, U. Simon, W. Strubing, K. Voss* : Discussion on Codazzi-tensors.

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Dan HENRY. — **Geometric theory of semilinear parabolic equations.** — Lecture notes in Mathematics, vol. 840. — Un vol. broché, 16,5 × 24, de iv, 348 p. — Prix: DM 39.00. — Springer-Verlag, Berlin/Heidelberg/New York, 1981.

*Preliminaries* : What is geometric theory ? Basic facts and notation. Sectorial operators and analytic semigroups. Fractional powers of operators. Invariant subspaces and exponential bounds. — *Examples of nonlinear parabolic equations in physical biological and engineering problems* : Nonlinear heat equation. Flow of electrons and holes in a semiconductor. Hodgekin-Huxley equations for the nerve axon. Chemical reactions in a catalyst pellet. Population genetics. Nuclear reactor dynamics. Navier-Stokes and related equations. — *Existence, uniqueness and continuous dependence* : Examples and counter-examples. The linear Cauchy problem. Local existence and uniqueness. Continuous and differentiable dependence of solutions. Smoothing action of the differential equation. Examples, the Navier-Stokes equation. — *Dynamical systems and Liapunov stability* : Dynamical systems and Liapunov functions. Converse theorem on asymptotic stability. Invariance principle. — *Neighborhood of an equilibrium point* : Stability and instability by the linear approximation. The saddle-point property. The Chafee-Infante problem and gradient flows. Traveling waves of parabolic equations. Essential spectrum of some ordinary differential operators. — *Invariant manifolds near an equilibrium point* : Existence and stability of an invariant manifold. Critical cases of stability. Bifurcation and transfer of stability for equilibrium points. Bifurcation of a periodic orbit from an equilibrium point. — *Linear nonautonomous equations* : Evolution operators and estimates. Linear periodic systems. The adjoint system and backward uniqueness. Slowly varying coefficients. Rapidly varying coefficients. Exponential dichotomies. — *Neighborhood of a periodic solution* : Stability and instability for nonautonomous systems. Orbital stability

and instability for autonomous systems. Perturbation of periodic solutions. The Poincaré map. Bifurcation and transfer of stability for periodic solutions. — *Neighborhood of an invariant manifold*: Existence, stability and smoothness of invariant manifolds. A coordinate system near an invariant manifold. Examples. — *Two examples*: A selection-migration model in population genetics. A problem in the theory of combustion.

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*Pierre Deligne*: Le groupe fondamental du complément d'une courbe plane n'ayant que des points doubles ordinaires est abélien. — *Michel Demazure*: Caractérisations de l'espace projectif (conjecture de Hartshorne et de Frankel) d'après Shigefumi Mori. — *Pierre Gabriel*: Algèbres auto-injectives de représentation finie. — *Michaël Gromov*: Hyperbolic manifolds according to Thurston and Jørgensen. — *Dale Husemoller*: La décomposition des espaces des lacets et la torsion impaire des groupes d'homotopie. — *Alberto Tognoli*: Algebraic approximation of manifolds and spaces. — *Bernard Beauzamy*: Sous-espaces invariants dans les espaces de Banach. — *Pierre Cartier*: La conjecture locale de Langlands pour  $GL(2)$  et la démonstration de Ph. Kutzko. — *Alain Connes*: Feuilletages et algèbres d'opérateurs. — *Nicole Desolneux-Moulis*: Orbites périodiques des systèmes hamiltoniens autonomes. — *Luc Lemaire*: Existence des applications harmoniques et courbure des variétés. — *Dennis Sullivan*: Travaux de Thurston sur les groupes quasi-fuchsiens et les variétés hyperboliques de dimension 3 fibrées sur  $S^1$ . — *Claude Bardos*: Apparition éventuelle de singularités dans des problèmes d'évolution non linéaires. — *Lionel Bérard-Bergery*: La courbure scalaire des variétés riemanniennes. — *Y. Colin de Verdière*: La matrice de scattering pour l'opérateur de Schrödinger sur la droite réelle. — *Michel Duflo*: Caractères des groupes de Lie résolubles. — *Harry Furstenberg*: Rigidity and cocycles for ergodic actions of semi-simple Lie groups. — *Yves Meyer*: Régularité des solutions des équations aux dérivées partielles non linéaires.

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Sur les extensions transcendantes séparables. Sur les produits tensoriels. La théorie de Galois des anneaux simples et semi-simples. Sur les systèmes d'involutions conjuguées et permutables dans les groupes projectifs. Linearly compact spaces and double vector spaces over fields. Algebraic homogeneous spaces over fields of characteristic two. Semi-dérivations et formule de Taylor en caractéristique  $p$ . On the orthogonal groups over the rational field. Sur les groupes orthogonaux rationnels à trois et quatre variables. Orthogonal and unitary groups over the rational field. Les idéaux minimaux dans les anneaux associatifs. Sur les  $p$ -groupes abéliens infinis. On the orthogonal groups over an algebraic number field. On the structure of unitary groups. Les extensions quadratiques des corps non commutatifs et leurs applications. On the structure of unitary groups (II). Sur les groupes unitaires quaternioniques à deux et trois variables. Les isomorphismes exceptionnels entre les groupes classiques finis. Sur les multiplicateurs des similitudes. Pseudo-discriminant and Dickson invariant. Sur les générateurs des groupes classiques. Sur la représentation paramétrique de Cayley. Remarks on quasi-Frobenius rings. — *Théorie des groupes formels* : Sur les groupes de Lie algébriques sur un corps de caractéristique  $p > 0$ . On semi-simple Lie algebras. Groupes de Lie et hyperalgèbres de Lie sur un corps de caractéristique  $p > 0$ . Lie groups and Lie hyperalgebras over a field of characteristic  $p > 0$  (II). Groupes de Lie et hyperalgèbres de Lie et hyperalgèbres de Lie sur un corps de caractéristique  $p > 0$  (III). Lie groups and Lie hyperalgebras over a field of characteristic  $p > 0$  (IV). Groupes de Lie et hyperalgèbres de Lie sur un corps de caractéristique  $p > 0$  (V). On the Artin-Hasse exponential series. Lie groups and Lie hyperalgebras over a field of characteristic  $p > 0$  (VIII). Remarques sur la réduction mod.  $p$  des groupes linéaires algébriques. Introduction à l'« Algèbre linéaire ». Préface au « Calcul infinitésimal ». Notice sur les travaux scientifiques.

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