

HANDBOOK OF CONVEX GEOMETRY

VOLUME A

Edited by
P.M. Gruber
J.M. Wills

NORTH-HOLLAND

HANDBOOK OF CONVEX GEOMETRY

Volume A

edited by

P.M. GRUBER,
Technische Universität Wien, Austria

J.M. WILLS,
Universität Siegen, Germany



1993

NORTH-HOLLAND
AMSTERDAM · LONDON · NEW YORK · TOKYO

ELSEVIER SCIENCE PUBLISHERS B.V.
Sara Burgerhartstraat 25
P.O. Box 211, 1000 AE Amsterdam, The Netherlands

Library of Congress Cataloging-in-Publication Data

Handbook of convex geometry / edited by P.M. Gruber, J.M. Wills.

p. cm.

Includes bibliographical references and index.

ISBN 0-444-89598-1 (set of vols A and B). – ISBN 0-444-89596-5

(vol A: alk. paper). – ISBN 0-444-89597-3 (vol B: alk. paper)

1. Convex geometry. I. Gruber, Peter M., 1941–. II. Wills,

Jörg M., 1937–

QA639.5.H36 1993

516'.08–dc20

93–6696

CIP

ISBN: 0 444 89596 5 (Vol A)

ISBN: 0 444 89597 3 (Vol B)

ISBN: 0 444 89598 1 (Set of Vols A and B)

© 1993 Elsevier Science Publishers B.V. All rights reserved

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the written permission of the Publisher, Elsevier Science Publishers B.V., Copyright & Permissions Department, P.O. Box 521, 1000 AM Amsterdam, The Netherlands.

Special regulations for readers in the U.S.A.: This publication has been registered with the Copyright Clearance Center Inc. (CCC), Salem, Massachusetts. Information can be obtained from the CCC about conditions under which photocopies of parts of this publication may be made in the U.S.A. All other copyright questions, including photocopying outside the U.S.A., should be referred to the Publisher, unless otherwise specified.

No responsibility is assumed by the Publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions or ideas contained in the material herein.

This book is printed on acid-free paper.

Printed in The Netherlands

HANDBOOK OF CONVEX GEOMETRY

Volume A

Preface

One aim of this Handbook is to survey convex geometry, its many ramifications and its relations with other areas of mathematics. We believe that it will be a useful tool for the expert. A second aim is to give a high level introduction to most branches of convexity and its applications, showing the major ideas, methods and results. We hope that because of this feature the Handbook will act as an appetizer for future researchers in convex geometry. For them the many explicitly or implicitly stated problems should turn out to be a valuable source of inspiration. Third, the Handbook should be useful for mathematicians working in other areas as well as for econometrists, computer scientists, crystallographers, physicists and engineers who are looking for geometric tools for their own work. In particular, mathematicians specializing in optimization, functional analysis, number theory, probability theory, the calculus of variations and all branches of geometry should profit from the Handbook.

The famous treatise “*Theorie der konvexen Körper*” by Bonnesen and Fenchel presented in 164 pages an almost complete picture of convexity as it appeared around 1930. While a similarly comprehensive report today seems to be out of reach, the Handbook deals with most of the more important topics of convexity and its applications. By comparing the Handbook with the survey of Bonnesen and Fenchel and with more recent collections of surveys of particular aspects of geometric convexity such as the AMS volume edited by Klee (1963), the Copenhagen Colloquium volume edited by Fenchel (1967), the two green Birkhäuser volumes edited by Tölke and Wills (1979) and Gruber and Wills (1983), respectively, and the New York Academy volume edited by Goodman, Lutwak, Malkevitch and Pollack (1985), the reader may see where progress was made in recent years.

During the planning stage of the Handbook, which started in 1986, we got generous help from many prominent convex geometers, in particular Peter McMullen, Rolf Schneider and Geoffrey Shephard. The discussion of the list of contents and of prospective authors turned out to be difficult. Both of us are obliged to the authors who agreed to contribute to the Handbook. In the cooperation with them we got much encouragement and the professional contacts furthered our good personal relations with many of them. The manuscripts which we finally received turned out to be much more diverse than we had anticipated. They clearly exhibit the most different characters and scientific styles of the authors and this should make the volume even more attractive.

There are several researchers in geometric convexity whom we invited to contribute to the Handbook but who for personal, professional or other reasons – regretfully – were not able to participate. The reader will also note that one area or another is missing in the list of contents. Examples are elementary geometry of normed planes, axiomatic convexity, and Choquet theory, but this should not diminish the usefulness of the Handbook.

Some fields such as computational and algorithmic aspects or lattice point results are dealt with in several chapters. The subjects covered are organized in five parts which in some sense reflect the fact that convexity is situated between analysis, geometry and discrete mathematics. This organization clearly has some disadvantages but we think that it will be helpful for the reader who wants to orient himself.

In the editing of the Handbook we received much help, in particular from Dr. M. Henk, Dr. J. Müller, Professor S. Hildebrandt, Professor L. Payne and Professor F. Schnitzer. We are most grateful to Ms. S. Clarius and Ms. E. Rosta who typed about 1000 letters to the authors, to colleagues whom we asked for advice and to the Publishers. We most gratefully acknowledge the friendly cooperations and expert support of Dr. A. Sevenster and Mr. W. Maas from Elsevier Science Publishers.

Finally we should like to express our sincere hope that the readers will appreciate the great effort of so many prominent authors and will find the Handbook useful for their scientific work.

Peter M. Gruber
Jörg M. Wills

List of Contributors

- Bayer, M.M., *University of Kansas, Lawrence, KS* (Ch. 2.3).
Bokowski, J., *TH Darmstadt* (Ch. 2.5).
Brechtken-Manderscheid, U., *Universität Würzburg* (Ch. 4.3).
Brehm, U., *Technische Universität Dresden* (Ch. 2.4).
Burkard, R.E., *Technische Universität Graz* (Ch. 2.8).
Connelly, R., *Cornell University, Ithaca, NY* (Ch. 1.7).
Eckhoff, J., *Universität Dortmund* (Ch. 2.1).
Edelsbrunner, H., *University of Illinois, Urbana, IL* (Ch. 2.9).
Engel, P., *Universität Bern* (Ch. 3.7).
Ewald, G., *Universität Bochum* (Ch. 2.6).
Fejes Tóth, G., *Hungarian Academy of Sciences, Budapest* (Ch. 3.3).
Florian, A., *Universität Salzburg* (Ch. 1.6).
Goodey, P., *University of Oklahoma, Norman, OK* (Ch. 4.9).
Gritzmam, P., *Universität Trier* (Chs. 2.7, 3.2 and 3.4).
Groemer, H., *University of Arizona, Tucson, AZ* (Chs. 1.4 and 4.8).
Gruber, P.M., *Technische Universität Wien* (Chs. 0, 1.9, 1.10, 3.1 and 4.10).
Heil, E., *TH Darmstadt* (Chs. 1.11 and 4.3).
Klee, V., *University of Washington, Seattle, WA* (Ch. 2.7).
Kuperberg, W., *Auburn University, Auburn, AL* (Ch. 3.3).
Lee, C.W., *University of Kentucky, Lexington, KY* (Ch. 2.3).
Leichtweiß, K., *Universität Stuttgart* (Ch. 4.1).
Lindenstrauss, J., *The Hebrew University, Jerusalem* (Ch. 4.5).
Lutwak, E., *Polytechnic University, Brooklyn, NY* (Ch. 1.5).
Mani-Levitska, P., *Universität Bern* (Ch. 1.1).
Martini, H., *Technische Universität Chemnitz* (Ch. 1.11).
McMullen, P., *University College, London* (Ch. 3.6).
Milman, V.D., *Tel-Aviv University* (Ch. 4.5).
Papini, P.L., *Università degli Studi, Bologna* (Ch. 4.6).
Pták, V., *Czechoslovak Academy of Sciences, Prague* (Ch. 4.7).
Roberts, A.W., *Macalester College, St. Paul, MN* (Ch. 4.2).
Sangwine-Yager, J.R., *Saint Mary's College of California, Moraga, CA* (Ch. 1.2).
Schmitt, P., *Universität Wien* (Ch. 2.2).
Schneider, R., *Universität Freiburg* (Chs. 1.8 and 5.1).
Schulte, E., *Northeastern University, Boston, MA* (Ch. 3.5).
Talent, G., *Università di Firenze* (Chs. 1.3 and 4.4).
Weil, W., *TH Karlsruhe* (Chs. 4.9 and 5.2).
Wieacker, J.A., *Universität Freiburg* (Chs. 5.1 and 5.2).
Wills, J.M., *Universität Siegen* (Chs. 2.4, 3.2 and 3.4).

Author Index

- Abbott, H. 420
 Abe, M. 462
 Aberth, O. 207, 208
 Abramowitz, M. 1142
 Adams, R.A. 1139
 Adhikari, A. 368
 Adler, I. 523, 635, 646
 Adler, I., *see* Monteiro, R.D.C. 633, 662
 Aepli, A. 1074
 Affentranger, F. 154, 321, 1384, 1395, 1398, 1399, 1402
 Agarwal, P.K. 717
 Aggarwal, A. 693
 Agmon, S. 651, 652
 Aho, A.V. 633, 693, 701, 769, 872
 Aigner, A. 565
 Akgül, M. 651
 Akgül, M., *see* Maurras, J.F. 652
 Akhmerov, R.R. 1229, 1233
 Aksionov, V.A. 410
 Aksoy, A.G. 1226, 1232, 1233
 Alagar, V.S. 1395
 Aleksandrov, A.D. 8, 10, 12, 14, 23, 30, 52, 53, 57, 58, 61–63, 76, 153, 167, 229, 231, 232, 243, 245, 247, 250, 280, 284, 285, 288–292, 295, 306, 363, 916, 942, 1057, 1059, 1062, 1065, 1071, 1072, 1280, 1299, 1300, 1331–1333
 Aleksandrov, P.S. 402, 430
 Alekseev, V.M. 1120
 Alexander, E. 1030
 Alexander, J.M., *see* Saaty, T.L. 865, 885, 886
 Alexander, R. 358, 368, 1320
 Alexander, S., *see* Olamy, Z. 887
 Alexanderson, G.L. 720
 Alexandrova, D.A., *see* Kotzev, J.N. 1030
 Alfsen, E.M. 356, 1307
 Allen, C.S. 1231
 Almgren, F.J. 6
 Alon, N. 408, 420, 426, 455, 474, 509, 525, 589, 711, 1172
 Altshuler, A. 526, 537, 539, 541, 542, 545, 558, 580, 582, 584, 586
 Altshuler, A., *see* Brehm, U. 539
 Ambartzumian, R.V. 12, 1320, 1351
 Amiouny, S.V. 885
 Amir, D. 360, 394, 1160, 1172, 1189
 Ammann, R. 922
 Ampère, A.M. 7
 Anagnostou, E.G. 728
 Andalefte, E.Z., *see* Freese, R.W. 30
 Anderson, R.D. 278, 1331
 Andreev, E.M. 889
 Andriyasyan, A.K. 757
 Anikonov, Yu.E. 148, 1284
 Anstreicher, K.M. 656
 Antonin, C. 577
 Araujo, A. 1405
 Archimedes 4
 Arnold, R. 130, 139, 310, 322, 338, 366, 1277
 Arnold, V.I. 781
 Aronov, B. 426, 711, 725
 Aronsson, G. 1141
 Arrow, K.J. 1406
 Artstein, Z. 1405, 1406
 Arzelà, C. 11, 12
 Ascher, E. 1024
 Aschkinuse, W.G. 352
 Ascoli, G. 11, 12
 Ash, A. 621
 Ash, P. 253
 Ashbaugh, M.S. 1143
 Asimow, L. 232, 239, 243, 245–247
 Asplund, E. 276, 309, 409, 1096, 1331, 1338
 Assouad, P. 1306
 Atiyah, M.F. 621
 Attouch, H. 1087
 Audier, M., *see* Guyot, P. 1033
 Audin, M. 621
 Aumann, G. 26, 364
 Aumann, R.J. 1404
 Aurenhammer, F. 721, 722
 Avis, D. 405, 644, 646, 705
 Avriel, M. 630

- Babai, L. 751
 Babenko, I.K. 188
 Babenko, V.F. 756
 Bachem, A. 557, 558, 564, 584, 588
 Bachem, A., *see* Kannan, R. 742
 Backus, G. 1279
 Baddeley, A.J. 975, 1428
 Baddeley, A.J., *see* Jensen, E.B. 1428
 Bagley, B.G. 887, 1033
 Bair, J. 356
 Baire, R. 12, 1329
 Bajmóczy, E.G. 429
 Bakel'man, I.Ja. 291
 Baker, B.S. 883
 Baker, B.S., *see* Brown, D.J. 884
 Baker, M.J.C. 401, 405, 431, 434
 Balas, E. 690, 890
 Balinski, M.L. 520, 685
 Ball, J.M. 1128, 1129
 Ball, K. 15, 157, 163, 164, 166, 167, 358, 360, 1170, 1176, 1180, 1183, 1209, 1210, 1313
 Ballicioni, A., *see* Couderc, P. 355
 Bambah, R.P. 9, 14, 745, 750, 757, 771, 814, 839, 840, 848, 871, 887
 Banach, S. 13, 15
 Banaszczyk, W. 745, 751
 Banchoff, T. 537, 543, 545, 942
 Banchoff, T.F. 351
 Bandle, C. 7, 56, 76, 1133
 Bandt, Chr. 308, 311, 312
 Bang, T. 1210
 Bangert, V. 22, 29, 280, 1058
 Bank, B. 682
 Bannai, E. 458, 849
 Bannai, E., *see* Bannai, E. 458
 Bantegnie, R. 30
 Baraki, G., *see* Bandt, Chr. 311
 Baranovskiĭ, E.P. 752, 810, 917, 1008
 Baranovskiĭ, E.P., *see* Ryškov, S.S. 752, 753, 756, 814, 844, 917
 Bárány, I. 158, 357, 360, 400, 405, 426, 429, 431, 432, 456, 502, 711, 781, 784, 850, 1335, 1336, 1398–1402
 Bárány, I., *see* Bajmóczy, E.G. 429
 Bárány, I., *see* Böröczky, K. 818
 Barnes, E.R. 659
 Barnes, E.S. 756
 Barnette, D.W. 13, 253, 494, 500, 502, 504, 505, 522, 523, 527, 537, 539, 541, 542, 544, 545, 644, 921
 Baronti, M. 310
 Barry, J.E., *see* Petty, C.M. 153
 Bartels, H.G. 691
 Bartels, S.G., *see* Bartels, H.G. 691
 Barthel, W. 363
 Bartholdi, J.J. 884
 Bartholdi, J.J., *see* Amiouny, S.V. 885
 Baston, V.J.D. 355
 Batyrev, V.V. 621
 Bauer, H. 15, 634
 Baumgartner, L. 919
 Bavaud, F. 365
 Bayer, D. 657, 658, 662
 Bayer, M.M. 503, 505, 506, 508, 516, 517, 519, 520, 527, 528, 590
 Beale, E.M.L. 642
 Beck, A. 467, 1161
 Beck, J. 1205
 Beckenbach, E.F. 1084
 Beer, G.A. 33, 310, 311, 1087
 Behrend, F. 15, 163, 164, 357, 360, 652
 Belickii, G.R. 1247
 Beling, P.A., *see* Adler, I. 635
 Bell, D.E. 783
 Ben-Or, M. 704
 Ben-Sabar, E., *see* Davis, P.J. 323, 338
 Bender, E.A. 524, 773
 Benders, J.F. 680
 Benguria, R.D., *see* Ashbaugh, M.S. 1143
 Bennett, G. 1174
 Benson, D.G. 64
 Benson, R.V. 355, 363
 Bentley, J.L. 720, 1401
 Benyamini, Y. 1195, 1196
 Benzer, S. 398, 418
 Berard, P. 76
 Berend, D. 926
 Beretta, L. 364
 Berezovskii, O.A., *see* Shor, N.Z. 338
 Berg, C. 290, 971, 972, 1264, 1265, 1308–1310
 Berge, C. 398, 406, 683
 Berger, K.H. 360
 Berger, M. 76, 84, 353, 354, 360, 1334
 Berger, R. 922
 Berman, J.D. 200
 Bernshtein, D.N. 605, 781, 944
 Bernstein, F. 131, 183
 Berwald, L. 12, 1280, 1358, 1378
 Besicovitch, A.S. 12, 183, 184, 193, 205, 208
 Best, M.R. 818

- Betke, U. 10, 66, 324, 335, 542, 544, 545, 547, 652, 768, 771, 773, 774, 778, 780–782, 870, 879, 943, 977, 979, 980, 1205, 1321, 1419
- Bezdek, A. 472, 813, 821, 834, 841, 844, 846–848, 918
- Bezdek, K. 183, 367, 471, 472, 803, 833, 847
- Bezdek, K., *see* Bezdek, A. 472, 847, 848
- Bialostocki, A. 456
- Bianchi, G. 187, 358, 359
- Bieberbach, L. 13, 65, 906, 995, 1013
- Bielawski, R. 32
- Bielecki, A. 409
- Bienia, W. 424
- Bieri, H. 60
- Bigalke, H.-G. 353
- Bigdeli, F. 511
- Bilinski, S. 548, 913
- Billera, L.J. 13, 34, 255, 491, 494, 495, 499, 500, 515, 516, 519, 575, 588, 623
- Billera, L.J., *see* Bayer, M.M. 503
- Billiet, Y. 1026
- Birch, B.J. 394, 427
- Birkhoff, G. 358, 685
- Birnbaum, Z. 1089
- Bishop, E. 21
- Bisztriczky, T. 456
- Björck, G. 29
- Björner, A. 35, 415, 418, 420, 491, 509, 517–519, 521, 525, 528, 539, 558, 564, 570, 584–587, 727
- Blanc, E. 31
- Bland, R.G. 557, 558, 564, 584, 592, 641, 643, 651
- Blaschke, W. 6, 7, 10–12, 15, 46, 48, 50, 55–57, 60, 64, 66, 76, 133, 154, 164, 166, 182, 187, 196, 247, 281, 290, 310, 325, 329, 353, 357–360, 941, 975, 1055, 1078, 1179, 1270, 1272, 1276, 1277, 1279, 1280, 1283, 1287–1289, 1299, 1301, 1308, 1310, 1329, 1351, 1355, 1358, 1359, 1375, 1381, 1383, 1396
- Blatter, C. 364
- Blech, I., *see* Shechtman, D. 925, 1031
- Bleicher, M.N. 466, 820
- Bleicher, M.N., *see* Beck, A. 467
- Blichfeldt, H.F. 5, 9, 747, 770, 772, 810, 814
- Blind, G. 352, 367, 494
- Blind, R. 31, 493
- Blind, R., *see* Blind, G. 352, 367, 494
- Bloh, E.L. 825
- Blokhuis, A. 457, 458
- Bodlaender, H.L. 634, 789, 873
- Boerdijk, A.H. 887
- Bohm, J. 1030
- Böhm, J. 214, 363–365, 939, 974
- Bohnenblust, H.F. 393, 400
- Bokowski, J. 9, 34, 51, 65, 337, 518, 519, 525, 537, 540, 543, 546, 560, 561, 563, 564, 573, 575, 580, 582–586, 590, 592, 773, 774, 1365
- Bokowski, J., *see* Altshuler, A. 580
- Bol, G. 11, 54, 59, 62, 63, 183, 209–211, 310, 363, 1270, 1286
- Boland, J.C., *see* Lekkerkerker, C.G. 418
- Bolker, E.D. 335, 362, 1204, 1299, 1300, 1305, 1310
- Bolker, E.D., *see* Ash, P. 253
- Boll, G. 131, 133
- Bolle, U. 822
- Bollobás, B. 435
- Boltianskii, V.G. 46
- Boltjanski, W.G. 355
- Boltjanskii, V.G. 30, 471
- Boltjansky, V.G. 470, 471
- Boltyanskii, V.G. 470
- Boltyanskiĭ, V.G. 357, 363, 365, 939
- Boltyanskiĭ, V.G. 399
- Boltyanskiĭ, V.G., *see* Yaglom, I.M. 363, 434
- Boltyansky, V.G. 469, 471, 472
- Bolza, O. 1108, 1120
- Bonnesen, T. 6, 14, 45, 47, 50, 51, 55, 56, 58, 59, 64, 65, 76, 129, 131, 156, 181–184, 209, 275, 353, 356, 358, 359, 361, 363, 364, 368, 430, 648, 772, 1263, 1264, 1279, 1299, 1308
- Bonnet, P.O. 14
- Bonnice, W.E. 430, 432, 433, 454
- Boots, B.N. 722
- Borell, C. 1158, 1180
- Borgwardt, K.H. 646, 1402
- Borisovich, Yu.G. 1230
- Böröczky, K. 14, 202, 364, 818, 831–834, 844, 848, 849
- Böröczky Jr, K. 870, 871
- Böröczky, K., *see* Bezdek, A. 847
- Boros, E. 431, 473
- Borsuk, K. 468
- Borwein, J.M. 28, 304, 435, 1229
- Bos, A. 9
- Bourgain, J. 11, 15, 55, 138, 148, 154, 156, 167, 168, 310, 335, 336, 360, 407, 745, 751, 778, 1159, 1160, 1167, 1170, 1173, 1174,

- Bourgain, J. (*cont'd*)
 1178–1180, 1182, 1184, 1186–1188, 1190,
 1192, 1196, 1197, 1199, 1200, 1202, 1205–
 1208, 1281, 1282, 1314, 1321
- Bourgin, D.G. 25
- Bourgin, R.D. 1097
- Bouwkamp, C.J. 463
- Bowyer, A. 716
- Brands, J.J.A.M. 1143
- Brascamp, H.J. 1136
- Bravaia, A. 1015, 1022, 1023
- Brechtken-Manderscheid, U. 1112
- Breen, M. 397, 398, 403, 405, 421, 423, 435
- Brehm, U. 336, 539–541, 543, 544, 546, 547
- Brehm, U., *see* Altshuler, A. 539, 542
- Brehm, U., *see* Bokowski, J. 543
- Bretagnolle, J. 1306
- Brianchon, C.J. 961
- Bricard, M. 11
- Bricard, R. 967
- Britton, S.C. 878
- Brodmann, H. 607, 609
- Brøndsted, A. 22, 355, 394, 488, 492–494, 704
- Bronshstein, E.M. 29, 312, 324
- Brooks, F. 29
- Brooks, J.N. 1057
- Brooks, R.L. 462, 464
- Brothers, J.E. 1136
- Brouwer, L.E.J. 15
- Browder, F.E. 1230, 1233
- Brown, A.L. 22
- Brown, D.J. 884
- Brown, D.J., *see* Baker, B.S. 883
- Brown, H. 906, 1020, 1022, 1025
- Brown, K.Q. 712
- Bruck, R.E. 358, 1231
- Brückner, M. 13, 352, 537
- Brudnyi, Yu.A. 410
- Bruggesser, H. 5, 7, 488, 714
- Brunn, H. 3, 6, 7, 21, 58
- Bryant, V.W. 32
- Brylawski, T.H. 424, 425
- Buchman, E.O. 395, 405, 436
- Buchta, C. 15, 321, 357, 1395, 1396, 1399,
 1402
- Buchta, C., *see* Bárány, I. 357, 1399
- Bückner, H. 364
- Budach, L. 942
- Buekenhout, F. 545, 548
- Buerger, M.J. 1019
- Bülöw, J., *see* Brown, H. 1020, 1022, 1025
- Bülöw, R., *see* Brown, H. 906
- Burago, Yu.D. 6, 33, 51, 55–58, 64, 76, 77,
 130, 153, 180, 306, 353, 359
- Burau, W. 353
- Burckhardt, J.J. 363, 905, 991, 1018, 1021,
 1025
- Burckhardt, J.J., *see* van der Waerden, B.L.
 1029
- Burger, T. 148, 1289
- Burkard, R.E. 332, 333, 678, 679, 681, 685
- Burkard, R.E., *see* Fruhwirth, B. 332
- Burke, J.G. 991
- Burling, J.P. 410
- Burrell, B.P., *see* Todd, M.J. 656, 659
- Burton, G.R. 361, 363, 459, 1371
- Burzlaß, H. 1007, 1013, 1026
- Burzlaß, H., *see* Billet, Y. 1026
- Burzlaß, H., *see* Fischer, W. 1027
- Busemann, H. 8, 12, 25, 30, 57, 153, 156, 160,
 161, 167, 228, 280, 287, 289, 292, 359, 942,
 1059, 1062, 1065, 1128, 1316
- Buser, P. 906, 995, 1016
- Butler, G.J. 188, 356
- Button, L. 334
- Caccioppoli, R. 90
- Cahn, J.W., *see* Shechtman, D. 925, 1031
- Cairns, S.S. 34
- Calabi, E. 166
- Calabi, L. 28, 29
- Calladine, C.R. 259
- Campi, S. 147, 148, 310, 1279, 1281–1283,
 1314
- Cano, J. 1229
- Carathéodory, C. 11–13, 76, 430, 1126
- Carl, B. 1183
- Carleman, T. 1383
- Carlsson, S. 1404
- Carnal, H. 1402
- Carpaneto, G. 685
- Cassels, J.W.S. 9, 33, 741, 767, 770, 771
- Catalan, E.C. 4
- Cauchy, A.L. 5, 6, 15, 51, 225, 226
- Cervone, D.P. 543
- Cesari, L. 1108, 1118–1120
- Chakerian, G.D. 64, 153, 182, 188, 190, 356,
 360, 362–368, 393, 407, 1271, 1273, 1278,
 1316, 1381
- Chalk, J.H.H. 9, 747, 751, 777

- Chan, J.B. 435
 Chand, D.R. 704
 Chandler, E. 1230
 Chandrasekaran, R. 642
 Charazishvili, A.B. 471
 Charve, H.F. 752
 Chaudhary, P. 887
 Chavel, I. 84
 Chazelle, B. 537, 705, 720, 725
 Chazelle, B., *see* Aronov, B. 426, 711
 Cheeger, J. 942
 Chen, W., *see* Beck, J. 1205
 Cheng, S.Y. 8, 289
 Cherkasskii, V.L., *see* Zamanskii, L.Y. 788
 Chern, S.S. 8, 12, 227, 292, 1051, 1071
 Chernoff, P.R. 1271
 Chevet, S. 1195
 Chisini, O. 76
 Chiti, G. 1143
 Choquet, G. 15, 355, 1301, 1305, 1306
 Christof, T. 690
 Christoffel, E.B. 8, 290, 1072
 Chui, C.K. 362
 Chung, F.R.K. 358, 458, 465, 884
 Chvátal, V. 455, 848
 Chvátal, V., *see* Avis, D. 646
 Cieślak, W. 362, 367, 368, 1271, 1274
 Clack, R. 163
 Clark, J.M.C., *see* Mallows, C.L. 1381
 Clarke, F.H. 1108
 Clarkson, K.L. 426, 704, 707, 711, 716
 Clivio, A. 466
 Cochand, M. 456
 Cochran, W. 1031
 Coffman, C.V. 1144, 1145
 Coffman, E.G. 882–885
 Coffman, E.G., *see* Baker, B.S. 883
 Cohen, E. 663
 Cohn, M.J. 821
 Cohn-Vossen, S., *see* Hilbert, D. 349, 351, 353, 354, 991
 Cohn-Vossen, S.E. 229
 Coleman, R. 1321, 1382
 Collier, J.B. 29
 Conforti, M. 684
 Connelly, R. 226, 227, 230, 232, 234–236, 239, 241, 242, 246, 251, 252, 256–266, 890
 Connelly, R., *see* Bezdek, K. 367, 847
 Converse, G. 361
 Conway, J. 9
 Conway, J.H. 741, 750, 756, 815, 818, 849, 867, 868, 876, 886, 888, 916, 1008, 1029, 1032
 Cook, W.D. 430
 Cook, W.J. 784, 788, 789
 Coolidge, J.L. 355
 Coppersmith, D. 884
 Cordovil, R. 423, 424, 460, 518, 559, 564, 587
 Cordovil, R., *see* Bienia, W. 424
 Cormen, T.H. 704, 708, 716, 717
 Corson, H. 29
 Couderc, P. 355
 Courant, R. 81, 1112
 Court, N.A. 355
 Cowan, R. 1428
 Coxeter, H.S.M. 4, 187, 207, 208, 349–351, 488, 524, 537, 545–548, 727, 811, 849, 865, 869, 887, 903, 905, 917, 925, 1019, 1299
 Cramer, G. 6
 Crapo, H. 226, 232, 236–238, 252, 253
 Crapo, H., *see* Ash, P. 253
 Crapo, H.H. 565
 Craveiro de Carvalho, F.J. 368
 Cremona, L. 252
 Cressie, N. 1405, 1406
 Crick, F.H.C., *see* Cochran, W. 1031
 Crippen, G.M. 226
 Crippen, T. 564
 Critchlow, K. 349
 Croft, H.T. 208, 353, 365–367, 451, 457
 Crofton, M.W. 12
 Crowe, D.W., *see* Beck, A. 467
 Császár, A. 537, 542
 Cudia, D.F. 22
 Cundy, H.M. 352
 Cunningham, W.H. 686
 Curie, P. 1024
 Cushman, R., *see* Billera, L.J. 516
 Dacorogna, B. 1108, 1119, 1126
 Dacunha Castelle, D., *see* Bretagnolle, J. 1306
 Dade, E.C. 1020
 Dakin, R.J. 678
 Daley, D.J. 1413
 Dalla, L. 357, 365, 1396
 Danaraj, G. 488, 496
 Danicic, V.I. 750
 Danilov, V.I. 499, 614, 620
 Danilova, N.I. 6
 Dantzig, G.B. 5, 522, 635, 638, 640, 643, 644

- Dantzig, G.B., *see* Veinott, A.F. 783
 Danzer, L. 13, 29, 31, 227, 360, 392–398, 400, 401, 403, 405–408, 411, 413, 414, 416, 417, 422, 430–435, 451, 465, 469, 652, 831, 834, 886, 908, 919–921, 925, 1033
 Darboux, G. 238
 Das Gupta, S. 8
 Dauter, Z. 1001
 Davenport, H. 9, 741, 743, 750, 773, 824
 Davis, C. 655
 Davis, P.J. 323, 338
 Davis, W.J. 1189, 1195, 1196
 Davy, P.J. 1382, 1383, 1418
 Davy, P.J., *see* Miles, R.E. 1383
 Dawson, R. 404
 Dawson, R.J.M. 463
 Day, M.M. 360
 Daykin, D.E. 463
 de Blasi, F.S. 1231, 1338, 1341
 de Bruijn, N.G. 924, 925, 1032
 de Buffon, G.L.L. 12
 de Castro Feitosa, E. 366
 de Comberousse, C., *see* Roché, E. 355
 de Finetti, B. 26
 de Giorgi, E. 77, 86, 90, 100
 de Saint-Venant, B. 7, 1133
 de Santis, R. 396, 427
 de Valcourt, B.A. 362, 367
 de Vries, H.L. 1143, 1276
 de Wolff, P.M. 1012
 Dean, D.W., *see* Davis, W.J. 1189
 Debrunner, H.E. 402, 919, 921
 Debrunner, H.E., *see* Hadwiger, H. 391, 407, 408, 410, 411, 413
 Dehn, M. 10, 11, 13, 243, 461, 509, 967
 Deicke, A. 12, 164, 1078
 Dekster, B.V. 365, 368, 470, 471
 Delone (Delaunay), B.N. 10, 13, 14, 712, 752, 755, 756, 814, 844, 901, 915, 917, 920, 992, 995, 1001, 1005, 1007, 1013
 Delsarte, P. 457, 825
 Deltheil, R. 1351
 Demazure, M. 606
 Democrit 4
 den Hertog, D. 658
 Descartes, R. 3, 5
 Deschaseaux, J.P. 1194, 1195
 Dette, H. 1402
 Devroye, L.P. 1401
 Deza, M. 404
 Dharmadhikari, S.W. 361
 Diaconis, P. 1208
 Dierker, P., *see* Białostocki, A. 456
 Diestel, J. 1097
 Dietrich, B.L., *see* Bland, R.G. 584
 Dieudonné, J. 1099
 Diewert, W.E., *see* Avriel, M. 630
 Dijkstra, E.W. 639
 Dikin, I.I. 659
 Dines, L.L. 639
 Ding, R. 779
 Ding, Y.S., *see* Lu, Y.Y. 364
 Dinghas, A. 6, 13, 56, 58, 64, 211, 1264, 1270, 1275, 1277, 1286–1288
 Dirichlet, G.L. 6, 10
 Dirichlet, P.G.L. 718, 752, 996, 1011
 Diskant, V.I. 8, 65, 129, 131, 134, 137, 138, 141, 147, 293–295, 310
 Dobkin, D.P. 326
 Doignon, J.-P. 422, 423, 425, 427, 429, 783
 Dolbilin, N.P., *see* Delone (Delaunay), B.N. 915, 992, 995
 Dol'nikov, V.L. 31, 367, 393, 396, 399, 409, 410, 434
 Dolženko, E. 1331
 Donnay, J.D.H., *see* Fischer, W. 1027
 Dony, E., *see* Buekenhout, F. 548
 Dor, L.E. 1190, 1204
 Dor, L.E., *see* Bennett, G. 1174
 Dorfman, R. 635
 Dostál, Z. 1245, 1254
 Dowker, C.H. 323, 837
 Dowling, A. 425
 Doyen, J. 465
 Drandell, M. 31
 Drešević, M. 311
 Dress, A.W.M. 351, 548, 901, 904, 914, 915
 Drobot, V. 1402
 Du Val, P. 1019
 Duchet, P. 32
 Duchet, P., *see* Cochand, M. 456
 Duchet, P., *see* Cordovil, R. 518
 Dudley, R.M. 312, 324, 423
 Duffin, R.J., *see* Coffman, C.V. 1144, 1145
 Dugundji, J. 403
 Duijvestijn, A.J.W. 463, 524
 Duijvestijn, A.J.W., *see* Bouwkamp, C.J. 463
 Dumir, V.C. 823, 848
 Dumir, V.C., *see* Bambah, R.P. 757
 Duneau, M. 1032

- Duneau, M., *see* Katz, A. 925, 1031
 Duneau, M., *see* Oguey, Ch. 925
 Dunford, N. 89, 92
 Dupont, J.L. 956, 965, 968
 Dvoretzky, A. 15, 27, 188, 393, 1152, 1166, 1176
 Dwyer, R.A. 1395, 1399, 1401, 1402
 Dyck, W. 1019
 Dyer, M.E. 649, 664, 788, 789, 874
- Eberhard, V. 528
 Eberlein, P. 833
 Eckhoff, J. 13, 392, 398, 413–415, 417–426, 428
 Eddy, W.F. 1395
 Edelman, P.H. 32
 Edelman, P.H., *see* Björner, A. 521
 Edelsbrunner, H. 10, 412, 426, 455, 487, 692, 702, 704, 705, 707, 710–712, 714, 717, 718, 720, 721, 723–725, 728, 729
 Edelsbrunner, H., *see* Agarwal, P.K. 717
 Edelsbrunner, H., *see* Aronov, B. 426, 711
 Edelsbrunner, H., *see* Aurenhammer, F. 722
 Edelsbrunner, H., *see* Chazelle, B. 720
 Edelstein, M., *see* Dawson, R. 404
 Edler, F. 6, 76
 Edmonds, A.L. 545
 Edmonds, J. 684, 686, 688, 784, 890
 Edmonds, J., *see* Pulleyblank, W.R. 687
 Edwards, D.A. 356
 Efimov, N.V. 226, 258
 Efron, B. 1397, 1399
 Eggleston, H.G. 45, 55, 85, 181, 188, 191, 275, 309, 323, 356, 357, 363, 393, 430, 433, 469, 848, 1263
 Eggleston, H.G., *see* Besicovitch, A.S. 205
 Egorychev, G.P. 57
 Ehlers, F. 620
 Ehlers, P.F. 1382
 Ehlers, P.F., *see* Enns, E.G. 1382
 Ehrhart, E. 10, 772, 774, 779, 782, 943
 Eikelberg, M. 619, 620, 622
 Eisenack, G. 1233
 Eisenstein, G. 1011
 Ekeland, I. 1084, 1089, 1119
 Elkholy, E.M. 368
 Elkies, N.D. 818
 Ellis, A.J. 356
 Elser, V. 925, 1032
 Elsgolc, L.E. 1108, 1110
- Enflo, P. 1161, 1193
 Enge, H., *see* Burkard, R.E. 678
 Engel, P. 13, 901, 905, 906, 917, 919, 992, 996–999, 1001, 1002, 1004, 1006, 1008, 1011–1013, 1015, 1019, 1021, 1025, 1027
 Englisch, H. 337
 Ennola, V. 836
 Enns, E.G. 1382
 Enns, E.G., *see* Ehlers, P.F. 1382
 Enomoto, K. 331
 Epstein, C.L. 227
 Epstein, P. 9
 Erdélyi, A. 1265
 Erdős, P. 153, 327, 453–456, 458, 710, 729, 741, 744, 754, 767, 770, 771, 777, 821, 881, 916, 1339
 Ėrlikh, I.I., *see* Tarasov, S.P. 338, 360, 652–654
 Eschenburg, J.H. 23
 Euclid 4, 5, 11
 Eudorus 4
 Euler, L. 5, 7, 11, 13, 15
 Euler, R. 691
 Evertz, S. 621
 Ewald, G. 34, 64, 277, 306, 514, 540, 585, 586, 614, 621–624, 1331
 Ewald, G., *see* Bokowski, J. 525, 582, 586
 Ewald, G., *see* Busemann, H. 25, 1316
 Ewing, G.M. 1112
 Ewings, J.H., *see* Edmonds, A.L. 545
- Faber, G. 7, 76, 1133, 1136
 Fabian, Cs. 679
 Fabian, M. 1331
 Falconer, K.J. 26, 362, 366, 397, 435, 1279, 1282, 1283, 1301, 1329
 Falconer, K.J., *see* Croft, H.T. 353, 365–367, 451
 Falikman, D.I. 57
 Fan, K. 5, 398, 405
 Farkas, G. 637
 Farkas, J. 5
 Faro Rivas, R. 337
 Fáy, I. 188, 822
 Faulkner, G., *see* Chandler, E. 1230
 Favard, J. 54, 60–62, 65
 Federer, H. 6, 22, 77, 85, 86, 91, 100, 102, 284, 285, 942, 1351, 1352, 1356, 1375
 Federico, P.J. 3, 463, 464
 Federico, P.J., *see* Duijvestijn, A.J.W. 524

- Fedorov, E.S. 10, 13, 756, 901, 906, 917, 1000, 1007, 1025
 Fedotov, V.P. 57, 290
 Fedotov, V.P., *see* Okuneva, V.A. 207
 Fejes Tóth, G. 14, 185, 187, 192, 193, 323, 335, 336, 361, 723, 803, 812, 823, 834, 840–843, 845, 846, 848, 865, 868, 870–872, 879, 885, 886, 888, 918, 1339
 Fejes Tóth, G., *see* Bisztriczky, T. 456
 Fejes Tóth, L. 14, 153, 179–190, 193, 196, 197, 199, 200, 202, 204–207, 212, 213, 321, 323, 326, 327, 330, 331, 335, 349, 352, 360, 406, 548, 741, 818, 820, 831, 834, 837, 838, 840–844, 846–850, 865, 868, 869, 871, 885–887, 905, 1275, 1335
 Fejes Tóth, L., *see* Coxeter, H.S.M. 187, 207
 Fejes Tóth, L., *see* Fejes Tóth, G. 336, 841, 842, 845
 Feller, W., *see* Busemann, H. 280, 1059
 Fenchel, W. 3, 8, 12, 14, 27, 33, 53, 57, 58, 61, 284, 289, 292, 393, 431, 432, 942, 1051, 1071, 1084, 1086, 1088, 1089
 Fenchel, W., *see* Bonnesen, T. 45, 47, 50, 51, 55, 56, 58, 65, 129, 131, 156, 181, 182, 209, 275, 353, 356, 358, 359, 361, 363, 364, 368, 430, 648, 772, 1263, 1264, 1279, 1299, 1308
 Fenske, C., *see* Eisenack, G. 1233
 Fernandez de la Vega, W. 882
 Festiopoulos, K., *see* Krätschmer, W. 886
 Few, L. 822, 823
 Few, L., *see* Coxeter, H.S.M. 811, 869
 Fiacco, A.V. 658
 Fiedler, R., *see* Jordan, C. 363, 364
 Figiel, T. 15, 1152, 1167, 1174, 1177, 1187, 1190, 1194
 Filliman, P. 202, 250, 255, 510
 Filliman, P., *see* Billera, L.J. 515
 Fillmore, J.R. 1289
 Fine, J. 498
 Firey, W.J. 8, 60, 66, 153, 206, 290, 291, 307, 337, 360, 362, 978, 1276, 1309, 1316, 1358, 1371
 Fischer, G. 352, 354, 363
 Fischer, K.G. 952
 Fischer, W. 919, 1027, 1029
 Fischer, W., *see* Koch, E. 919, 1026, 1027
 Fishburn, P.C. 418
 Fisher, J.C. 364, 1269, 1271, 1274, 1276
 Flanders, H. 64, 133, 1245
 Fleck, G., *see* Senechal, M. 906
 Fleming, W.H. 6, 90, 102
 Fleming, W.H., *see* Federer, H. 77
 Fletcher, R. 636
 Florian, A. 14, 185, 187, 189, 191, 194–197, 199–201, 204, 214, 309, 310, 322, 335, 822, 843, 846, 1275
 Florian, A., *see* Fejes Tóth, G. 192, 193, 335, 843
 Florian, A., *see* Fejes Tóth, L. 197, 843
 Florian, H. 199
 Focke, J. 1271, 1273, 1274
 Fogelsanger, A. 251
 Foland, N.E. 435
 Folkman, J.H. 775, 840, 886
 Fomenko, A.T., *see* Volodin, I.A. 496
 Fomin, S.V., *see* Alekseev, V.M. 1120
 Föppl, L. 919
 Ford, L.R. 639, 686
 Ford, L.R., *see* Dantzig, G.B. 638
 Fortune, S.J. 719–721
 Fourier, J.B. 5, 9, 635, 639
 Fourneau, R. 303, 304, 356
 Fourneau, R., *see* Bair, J. 356
 Fowler, R.J. 889
 Franchetti, C. 365
 Frank, A. 364, 890
 Frank, A., *see* Cunningham, W.H. 686
 Frank, F.C. 887, 1033
 Frankenheim, M.L. 992, 1015, 1022
 Frankl, P. 404
 Frankl, P., *see* Deza, M. 404
 Franz, R. 915
 Franz, R., *see* Dress, A.W.M. 915
 Fredman, M.L. 728
 Freedman, B., *see* Vanderbei, R. 659
 Freese, R.W. 30, 465
 Frehse, J. 1138
 Freund, R.M. 787, 873
 Fricker, F. 768
 Friedman, A. 1136
 Friedrich, W. 991
 Friesen, D.K. 883
 Frieze, A.M., *see* Dyer, M.E. 649, 788, 789, 874
 Frisch, K.R. 658
 Frobenius, F.G. 906, 995
 Frobenius, G. 1249
 Frobenius, G.F. 13
 Fruhwirth, B. 332
 Frumkin, M.A. 742

- Fuglede, B. 8, 131, 142, 143, 1287
 Fujishige, S. 686
 Fujiwara, M. 1273, 1274
 Fukuda, K. 564, 584, 587, 588, 590
 Fukuda, K., *see* Avis, D. 644, 705
 Fulkerson, D.R. 683
 Fulkerson, D.R., *see* Dantzig, G.B. 638
 Fulkerson, D.R., *see* Ford, L.R. 639, 686
 Fullbright, B.E. 409
 Fuller, R.B. 260
 Fulton, W. 607
 Funk, P. 1125, 1279, 1283, 1308
 Füredi, Z., *see* Bárány, I. 426, 429, 431, 456, 711, 850, 1402
 Füredi, Z., *see* Bezdek, K. 472
 Füredi, Z., *see* Boros, E. 431
 Furstenberg, H. 162

 Gaćz, P. 651
 Gadolin, A.V. 1015
 Gage, M.E. 56, 131
 Gähler, F. 1032
 Gähler, F., *see* Korepin, V.E. 925
 Gajowski, J. 365
 Gale, D. 5, 304, 355, 469, 637
 Gale, J.D., *see* Eddy, W.F. 1395
 Galiulin, R.V. 1023, 1026, 1032
 Galiulin, R.V., *see* Delone (Delaunay), B.N. 915, 992, 995
 Gallot, S. 76
 Gandini, P.M. 871, 1331
 Garbe, D. 546
 Garcia, C.B. 662
 Gardner, M. 364, 922
 Gardner, R.J. 167, 362, 1339
 Garey, M.R. 633, 649, 683, 691, 769, 872, 882, 883
 Garey, M.R., *see* Aho, A.V. 693
 Garey, M.R., *see* Chung, F.R.K. 884
 Garey, M.R., *see* Coffman, E.G. 882–885
 Garling, D.J.H. 1164, 1176, 1195
 Garms, K., *see* Bokowski, J. 540, 580, 592
 Garsia, A.M. 1136
 Gáspár, Zs., *see* Tarnai, T. 831
 Gass, S. 646
 Gates, J. 1381, 1384
 Gauduchon, P., *see* Berger, M. 76
 Gauss, C.F. 5, 7, 8, 14, 752, 802, 814
 Gay, D. 656
 Gečiauskas, E. 1381, 1382

 Geiss, S. 1177
 Geivaerts, M. 306
 Gelfand, I.M. 515, 1316
 Gel'man, B.D., *see* Borisovich, Yu.G. 1230
 Gendzwill, D.J. 360
 Geppert, H. 1270, 1276, 1286, 1287
 Gerber, L. 355
 Gericke, H. 76, 182, 1270, 1271, 1275, 1276
 German, L.F. 30
 Gerwien, P. 966
 Ghandehari, M. 366, 368
 Ghouila-Houri, A. 398
 Giannopoulos, A.A. 167
 Giaquinta, M. 1108
 Giebler, P. 364
 Giering, O. 353, 360, 1339
 Giessen, B.C., *see* Chaudhary, P. 887
 Giesy, D.P. 1160, 1171
 Gilbert, E.N. 353, 1282, 1424
 Gilbert, E.N., *see* Chung, F.R.K. 358, 458, 465
 Gilbert, J.E. 1156
 Giles, J.R. 1084, 1097, 1098
 Giles, R., *see* Edmonds, J. 684, 686
 Gill, P.E. 653, 658
 Giné, E. 1405, 1406
 Giné, E., *see* Araujo, A. 1405
 Giusti, E. 91
 Gizaslewic, R. 26
 Glaser, L.C. 538
 Gleason, A.M. 331
 Gluck, H. 24, 230, 232, 243, 245, 246, 252, 289
 Glur, P., *see* Hadwiger, H. 966
 Gluskin, E.D. 15, 309, 1152, 1174, 1191–1193, 1197, 1198
 Göbel, F. 881
 Godbersen, C. 356, 357
 Goebel, K. 1223–1228, 1230–1233
 Goethals, J.M., *see* Delsarte, P. 457, 825
 Goffin, J.L. 651, 652
 Gohberg, I.T. 471
 Gohberg, I.T., *see* Boltjansky, V.G. 470, 471
 Gohberg, I.T., *see* Boltyanskii, V.G. 470
 Gołąb, S. 29, 360
 Goldberg, M. 199, 212, 213, 367, 831, 919, 1245
 Goldfarb, D. 633, 651, 658
 Goldfarb, D., *see* Bland, R.G. 651
 Goldman, W.M. 35
 Goldstein, A.A. 661

- Golubyatnikov, V.P. 147
 Gomory, R.E. 5
 Gonzaga, C. 659, 661–663
 Gonzalez-Sprinberg, G. 592
 Goodey, P.R. 138, 140, 145, 147, 148, 182, 290, 291, 306, 359, 362, 363, 366, 977, 978, 1277, 1279, 1281, 1282, 1286, 1287, 1289, 1308–1310, 1312, 1314, 1315, 1317–1319, 1358, 1359, 1378, 1423
 Goodey, P.R., *see* Betke, U. 977
 Goodey, P.R., *see* Chakerian, G.D. 182
 Goodman, J.E. 392, 405, 411–415, 422, 423, 426, 454, 455, 459, 525, 540, 562, 577, 587, 588, 590, 726
 Goodman, V., *see* Bennett, G. 1174
 Goodner, D.A. 1188
 Gordan, P. 5
 Gordon, Y. 168, 202, 1166, 1189, 1190, 1193
 Gordon, Y., *see* Benyamini, Y. 1195, 1196
 Gordon, Y., *see* Garling, D.J.H. 1176, 1195
 Gornuéjols, G., *see* Conforti, M. 684
 Görtler, H. 1270, 1275, 1276
 Gostiaux, B., *see* Berger, M. 84, 354
 Gott III, J.R. 548
 Goursat, E. 1019
 Gowers, W.T. 1172, 1200
 Gózdź, S. 1274
 Gózdź, S., *see* Cieślak, W. 367, 1271, 1274
 Grace, D.W. 200
 Graev, M.I., *see* Gelfand, I.M. 1316
 Graf, S. 309
 Graham, R.L. 454, 466, 470, 704, 840, 886, 888
 Graham, R.L., *see* Chung, F.R.K. 458, 465
 Graham, R.L., *see* Erdős, P. 881
 Graham, R.L., *see* Folkman, J.H. 775, 840, 886
 Gram, J.P. 961
 Granot, F. 633
 Gratias, D., *see* Shechtman, D. 925, 1031
 Grattan-Guinness, I. 635
 Gray, A. 352
 Green, J.W. 163
 Greene, C. 425
 Grenander, U. 1395
 Grenander, U., *see* Carlsson, S. 1404
 Gretenkort, J., *see* Kleinschmidt, P. 622
 Grinberg, E.L. 162, 169, 1316
 Gritzmman, P. 60, 66, 325, 338, 339, 356, 364, 542, 544, 545, 631, 634, 681, 773, 775, 776, 787, 789, 810, 868, 870, 872–874, 876, 878, 879, 884, 887–890
 Gritzmman, P., *see* Barnette, D.W. 542
 Gritzmman, P., *see* Betke, U. 545, 547, 652, 774, 870, 879
 Gritzmman, P., *see* Bodlaender, H.L. 634, 789, 873
 Gritzmman, P., *see* Dyer, M.E. 788
 Gritzmman, P., *see* Fejes Tóth, G. 865, 870, 871, 879, 888
 Groemer, H. 8, 10, 15, 48, 60, 130, 131, 133–137, 140, 141, 143–148, 154, 310, 311, 359, 364–366, 743, 775, 803, 805, 813, 820, 842, 850, 868, 881, 885, 917, 938, 941, 953, 975, 1263, 1271, 1276, 1283, 1287, 1357, 1358, 1366, 1372, 1383, 1396
 Groemer, H., *see* Chakerian, G.D. 364–366, 368, 1273, 1278
 Groemer, H., *see* Goodey, P.R. 138, 140, 145, 147, 148, 366, 1277, 1279, 1282, 1286, 1287, 1314
 Groeneboom, P. 1401
 Gromov, M. 31, 251, 255, 1181, 1187
 Gross, H., *see* van der Waerden, B.L. 752, 1014
 Gross, W. 6, 55, 187, 188, 336
 Grothendieck, A. 1164, 1166
 Grötschel, M. 10, 360, 645, 650, 651, 654, 682, 690–692, 741, 746, 754, 785–787, 875, 876
 Grötzsch, H. 410
 Gruber, B., *see* de Wolff, P.M. 1012
 Gruber, B., *see* Křivý, S. 1012
 Gruber, P.M. 3, 12, 153, 158, 170, 188, 191, 303, 307–311, 321, 326, 327, 329–331, 333, 334, 356, 358–360, 365, 419, 654, 741, 751, 754, 756, 757, 767, 770, 771, 786, 807, 867, 916, 918, 943, 1014, 1231, 1290, 1331–1337, 1339, 1340, 1401
 Gruber, P.M., *see* Bianchi, G. 358
 Gruber, P.M., *see* Erdős, P. 153, 327, 741, 744, 754, 767, 770, 771, 777, 916, 1339
 Grünbaum, B. 7, 13, 14, 26, 34, 153, 181, 211, 233, 240, 242, 246, 260, 307, 310, 323, 352, 355, 357, 362, 394, 395, 397, 399, 403, 405–407, 409–411, 413, 414, 465, 469–471, 488, 489, 491, 493, 495, 496, 504, 511–514, 518, 520–522, 524, 526, 528, 537, 540, 541, 544, 546–548, 557, 559, 564, 648, 704, 723, 768, 778, 779, 850, 873, 901, 902, 904–908,