

Author Index

- Agarwal, P. K. 783
 Aigner, M. 37, 165, 168, 170,
 176–7, 476, 811
 Ajtai, M. 226, 451, 492, 663–4,
 779, 793
 Akin, E. 143–4, 152
 Akiyama, J. 268, 412, 418–9,
 677, 816
 Aksionov, V. A. 414
 Albert, M. H. 433
 Albertson, M. O. 356, 419, 423,
 797
 Aldred, R. E. L. 326
 Alexanderson, G. L. 388
 Alkan, E. 80
 Alladi, K. 59
 Alon, N. 356, 396–7, 412, 434,
 442, 503–4, 510, 633, 657,
 661–6, 669–74, 677–8, 684–5,
 688, 696, 704, 706, 721–2,
 728, 731, 733–6, 738–9,
 745–6, 764, 771, 778–80,
 809–10, 816, 829–30, 832
 Alspach, B. 646–7
 Altinisik, E. 177, 766
 Amahashi, A. 273
 Andersen, L. D. 360, 373
 Anderson, I. 264, 275, 497, 561,
 595, 607, 609, 612, 649, 654
 Anderson, M. 794
 Ando, K. 249, 819
 André, D. 40, 208
 Andreae, T. 366
 Andrews, G. 148
 Andrews, G. E. 66, 140, 150–1
 Andrews, P. 174
 Appel, K. 402, 406
 Arnautov, V. I. 670
 Arratia, R. 432–3
 Arrow, K. J. 585
 Ash, P. 34
 Atanassov, K. 29
 Avis, D. 820
 Axenovich, M. 686
 Ayel, J. 331
 Azuma, K. 715, 722
 Babai, L. 699, 705, 723, 727–8,
 731, 744
 Bábler, F. 250, 267
 Bach, E. 105
 Bacher, R. 66
 Bachmann, P. 10
 Backelin, J. 442
 Bagga, J. S. 325
 Baker, K. A. 561, 571
 Balko, M. 457
 Ball, S. 633
 Ball, W. W. R. 70
 Balof, B. 586
 Balogh, J. 421, 424, 801, 819
 Banderier, C. 28, 41
 Bandlow, J. 190
 Bang, C. M. 261
 Bang-Jensen, J. 685
 Bang, S.-J. 32
 Bannai, E. 244, 775
 Bapat, R. B. 766, 769
 Bárány, I. 810, 812, 820
 Barát, J. 238
 Barber, B. 640
 Barra, M. 62
 Barrera-Cruz, F. 790
 Basavaraju, M. 329
 Basin, S. L. 61
 Batagelj, V. 330
 Bauer, D. 318, 326, 490
 Baumert, L. D. 622, 637
 Bean, D. R. 342
 Beck, J. 455, 659, 673, 680
 Beckwith, D. 32, 49, 59, 148–9,
 152, 173, 764
 Behrend, F. A. 484
 Behzad, M. 329, 343, 373, 398,
 654
 Beineke, L. W. 620–1, 624, 794,
 798
 Belck, H.-B. 268, 276
 Belevitch, V. 621
 Bender, E. A. 62, 127, 207, 697,
 704
 Benevides, F. S. 461
 Benhocine, A. 326
 Benjamin, A. T. 53, 664
 Bennett, G. 152
 Bentz, H.-J. 144, 152
 Benzer, S. 337
 Berge, C. 222, 263, 266–7, 277,
 333, 335, 366–8, 370, 501,
 549, 667
 Berger, E. 549
 Berlekamp, E. R. 724, 744
 Berman, D. M. 419
 Berman, K. A. 241, 249
 Bermond, J.-C. 316, 323, 685
 Bernardi, C. 355
 Bernshteyn, A. 680
 Bertrand, J. 39
 Bessy, S. 685
 Beth, T. 609
 Beutelspacher, A. 473

- Bey, C. 511
 Bhanu, K. S. 669
 Bhasker, J. 353
 Bhatt, S. N. 809
 Bialostocki, A. 490
 Biedl, T. 286
 Bienstock, D. 795–6
 Biggs, N. 766
 Biggs, N. L. 37, 46
 Binet, J. P. 67
 Birkhoff, G. 257, 405, 421, 594, 607
 Biró, C. 580
 Bixby, R. E. 521
 Björner, A. 804
 Blagojević, P. V. M. 815
 Blass, A. 690
 Blokhuis, A. 725, 744
 Bloom, D. M. 33
 Bloome, L. 344
 Boesch, F. 237
 Bogart, K. P. 147, 583, 586–7
 Bognár, J. 105
 Bohman, T. 665, 682, 685, 771
 Bollobás, B. 215, 238, 244, 250, 272, 311, 316, 335, 351, 362, 373, 478, 482, 488, 499, 511, 568, 632, 657, 668, 688, 692, 697, 699–701, 703, 717–8, 721–2, 770, 821
 Bóna, M. 101–2, 106, 133, 158, 432, 440, 442, 474
 Bonamy, M. 413, 685
 Bonato, A. 708
 Bondarenko, A. 817
 Bondy, J. A. 215, 227–8, 251, 296, 302, 316, 320, 323, 326–7, 330, 332, 460, 479, 489, 639, 684
 Bonnice, W. E. 458
 Booth, K. S. 393
 Boppana, R. B. 504
 Borchardt, C. W. 37
 Borg, P. 500, 503
 Borodin, O. V. 348, 355, 364–5, 407, 411–6, 423
 Borozan, V. 373
 Borsuk, K. 809–10, 817
 Borůvka, O. 246, 520
 Bosák, J. 319, 331, 418
 Bose, R. C. 610, 612, 615, 627, 641–3, 651–5
 Bouchet, A. 273
 Boyer, J. 393
 Brandstädt, A. 370
 Brandt, A. 422
 Brandt, J. 143–5
 Brandt, S. 262, 356, 454
 Branin, F. H., Jr. 763
 Brègman, L. M. 510
 Brestovansky, W. 473
 Brightwell, G. R. 394, 543, 600, 722, 790, 823, 831
 Broersma, H. 320, 327
 Broersma, H. J. 318, 342
 Broline, D. M. 103, 144
 Brooks, R. L. 336
 Brouwer, A. E. 735, 766, 771
 Brouwer, L. E. J. 805
 Brown, J. L. 441
 Brown, T. C. 473
 Brown, W. G. 228, 632–3, 684
 Brualdi, R. A. 34, 174, 539
 Bruck, R. H. 616, 627
 Bruhn, H. 503, 512
 Bryant, D. 646–8
 Bryant, P. R. 763
 Brylawski, T. H. 529–30, 539
 Bucić, M. 460, 685
 Buckholtz, T. J. 65
 Buckley, F. 215
 Bukh, B. 479
 Bunde, D. P. 668
 Buneman, P. 80, 373
 Buratti, M. 646
 Burns, D. 251
 Burr, S. A. 454, 456–7, 459–61, 484
 Burštejn, M. I. 418–9
 Burungale, A. 238
 Butler, S. 237, 425
 Butterfield, J. 457
 Cabello, S. 795
 Callan, D. 35, 49, 59, 63–4, 81, 134, 151, 174
 Cameron, K. 241–2, 249, 276
 Cameron, K. B. 549
 Cameron, P. J. 261, 609, 774
 Camion, P. 334
 Campbell, C. 238
 Canfield, E. R. 567, 697, 704
 Cannings, C. 144
 Cantor, D. G. 514
 Cao, W. 731
 Carlitz, L. 101, 177
 Caro, N. 174
 Caro, Y. 236, 263, 327, 461, 662
 Cartwright, D. P. 237
 Catalan, E. 41
 Catlin, P. A. 349, 355–6
 Cayley, A. 36–7, 47
 Chaiken, S. 749
 Chambers, E. W. 668
 Chandran, L. S. 329
 Chandrasekharan, K. 140
 Chang, G. J. 373
 Chang, W. I. 439
 Chappell, G. G. 551
 Charalambides, C. A. 101
 Charbit, P. 512
 Chartrand, G. 215, 250, 272–3, 295, 315, 343, 377, 398, 418
 Chein, M. 312
 Chelnokov, V. M. 777
 Chen, G. 249, 314, 318, 473
 Chen, Z.-H. 540
 Cherkashin, D. D. 660, 673
 Chernoff, H. 707
 Chervonenkis, A. Y. 711–2
 Chetwynd, A. G. 359
 Chevalley, C. 735
 Chevalley, H. 735
 Chiba, S. 326
 Chiue, W.-S. 292
 Choi, J. O. 239
 Chow, T. 175
 Chowlá, S. 616
 Chudnovsky, M. 370
 Chung, F. R. K. 249, 341, 446, 451, 460, 473, 491, 508–9, 776, 779
 Chung, K. L. 50
 Chung, M.-S. 490
 Chvátal, V. 229, 318, 320–1, 326, 332, 354, 370, 375, 389, 419, 453–5, 458, 483, 501–2, 666, 793
 Chvátalová, J. 800, 818
 Cibulka, J. 457
 Cigler, J. 50
 Clapham, C. R. J. 332
 Clark, D. S. 429
 Clark, L. H. 764
 Clark, P. L. 732
 Clements, G. F. 496, 511

- Cohen-Addad, V. 414
 Cohen, N. 373, 413
 Cohn, M. 820
 Colbourn, C. J. 609, 641, 646
 Coleman, M. 434, 442
 Collins, K. L. 418
 Comtet, L. 65
 Conlon, D. 334, 425, 450–1, 453, 457, 459, 484–5, 608
 Cook, S. 11
 Corradi, K. 490
 Cox, D. A. 173
 Cranston, D. W. 152, 336, 373, 407, 411, 413, 422–4, 668
 Crapo, H. H. 521
 Cruse, A. B. 274
 Csirik, J. A. 801
 Cull, P. 80, 237
 Curran, S. 315
 Cushing, W. 742
 Cvetković, D. M. 766, 781
 Czipzer, J. 216

 Dályay, P. P. 115, 623
 Damereell, R. M. 244, 775
 Danese, A. E. 61
 Danziger, P. 647–8
 David, K. 47
 Davis, M. 143–4, 152
 Daykin, D. E. 496–7, 500–1, 511–2, 564, 567, 596, 607–8
 de Abreu, N. M. M. 778
 de Bruijn, N. G. 239, 468, 554, 752
 de Figueiredo, C. M. H. 798
 de Fraysseix, H. 783
 de Grey, A. 342
 de Moivre, A. 67, 153
 de Werra, D. 372
 Dean, A. M. 794
 Dean, N. 249, 795–6
 Dean, R. A. 587, 604
 DeBiasio, L. 327, 334, 460
 Dekster, B. V. 817
 Delannoy, H. 28–9
 Delcourt, M. 685
 Delsarte, P. 744
 Demaine, E. D. 286
 Demoucron, G. 393
 Dénes, J. 610, 623
 Derbyshire, J. 10
 DeSario, R. 442

 Descartes, B. 434
 Deshpande, B. 92, 668
 Deshpande, M. N. 92, 104, 115, 668–9
 DeTemple, D. 389
 Deuber, W. 462
 Deutsch, E. 21–2, 48–50, 59, 62, 82, 105, 148–9, 151, 164
 Deza, M. 510–1, 728
 Dias da Silva, J. A. 734, 746
 Díaz-Barrero, J. L. 32
 Dickson, L. E. 48, 473
 Diestel, R. 215, 377, 488
 Dijkstra, E. W. 246, 252
 Dilcher, K. 32
 Dilworth, R. P. 546, 574, 606–7
 Dinitz, J. H. 609, 646
 Dirac, G. A. 301–2, 315–6, 320, 323, 345, 349, 351, 353, 355, 367, 490
 Djidjev, H. N. 397
 Djokovic, D. 32
 Dmitriev, I. G. 374
 Doberinski, G. 134
 Dobkin, D. P. 815
 Dodgson, C. L. 170, 178
 Dol'nikov, V. L. 812
 Doob, M. 766, 781
 Došlić, T. 275
 Doster, D. 82, 91
 Doubilet, P. 127
 Dross, F. 640
 Dubhashi, D. P. 706, 721
 Dudek, A. 276, 455
 Duffus, D. 601
 Dujmović, V. 680
 Dulmage, A. L. 654
 Duncan, C. A. 286
 Duraj, L. 742
 Dushnik, B. 569–70, 576–7, 831
 Dvir, Z. 746
 Dvořák, Z. 356, 414
 Dvoretzky, A. 42
 Dzhumadiĭdaeva, A. A. 115
 Dziobek, O. 46

 Eaton, N. 484, 745
 Eckhoff, J. 496
 Ecklund, E. F. 80
 Edelman, P. 208
 Edelsbrunner, H. 815

 Edmonds, J. 241–2, 249, 251, 264, 275–6, 278, 282, 297, 518, 521, 530, 533–4, 536
 Edwards, K. 416
 Egawa, Y. 327
 Egecioglu, Ö. 36
 Egerváry, E. 258, 531
 Eggleston, H. G. 817
 Egorychev, G. P. 256, 765
 Eitner, P. G. 818
 Elder, M. 433
 Eliahou, S. 745
 Elkies, N. 34
 Ellingham, M. 334
 Ellingham, M. N. 326–7, 330
 Ellis, D. 509
 Enchev, O. 261
 Engel, A. 226
 Engel, K. 493, 496, 511
 Enomoto, H. 318, 355, 412
 Entringer, R. C. 330, 347, 428, 441
 Era, H. 418
 Erdős, P. 219, 223, 238, 244, 251–2, 269, 273–6, 321–2, 332–4, 341–8, 354–6, 394, 426, 430, 434, 438, 446, 450–1, 454–61, 468–70, 473, 476–9, 482–4, 489–91, 497–8, 503–4, 512–4, 551, 561, 608, 632, 658–60, 664, 667–71, 675, 679, 682–7, 698–9, 701–5, 709, 721, 734, 764, 770, 793, 798
 Erdős, P. L. 47, 135
 Erman, R. 424
 Eršov, A. P. 353
 Esperet, L. 680, 765
 Etienne, G. 144, 152
 Euler, L. 141, 148, 151, 234, 383
 Evans, A. B. 624
 Even, S. 343
 Everman, D. 61
 Exoo, G. 412, 677

 Faà di Bruno, F. 127
 Faigle, U. 533
 Fajtlowicz, S. 709
 Falcón, S. 80
 Falgas-Ravry, V. 475
 Falikman, D. I. 256, 765
 Fan, G. 324–6

- Farber, M. 374
 Faria, L. 798
 Fáry, I. 393
 Farzad, B. 237
 Fasenmyer, M. C. 90
 Faudree, R. J. 262, 316, 327,
 454–5
 Favaron, O. 273
 Feige, U. 684
 Feller, W. 40, 50, 668
 Felsner, S. 783–4, 790, 823, 828
 Feng, W. 286
 Ferguson, T. 669
 Ferrara, M. 422
 Fiedler, M. 778
 Fielder, D. C. 65
 Figaj, A. 492
 Filmus, Y. 509
 Finck, H.-J. 338, 344
 Fink, J. 330
 Fiorini, S. 361, 414
 Firke, F. A. 630
 Fishburn, P. 586
 Fishburn, P. C. 586–7, 600, 604,
 823, 828, 832
 Fisher, D. C. 418, 550
 Fisher, R. A. 614
 Fisk, S. 419
 Fiz Pontiveros, G. 682
 Fleischer, R. 286
 Fleischner, H. 331, 739, 763
 Floyd, R. W. 257
 Foata, D. 50, 99, 101, 106, 127,
 177
 Folkman, J. 455, 466
 Fomin, F. V. 342
 Fon-Der-Flaass, D. G. 649, 782
 Ford, G. W. 135
 Ford, K. 669
 Ford, L. R., Jr. 300, 302, 532
 Fortuin, C. M. 596
 Foulkes, H. O. 197
 Fouquet, J. L. 334
 Fournier, J.-C. 372
 Fox, J. 334, 425, 451, 453, 457,
 459, 484–5, 551, 601, 608,
 672–3, 684
 Frame, J. S. 190
 Frank, A. 307, 310, 548
 Frankl, P. 450, 459, 488, 493,
 495–7, 499–500, 503, 508–11,
 723, 727–30, 744
 Franklin, F. 141–2, 151
 Franklin, P. 406
 Franzblau, D. S. 192
 Fraughnaugh (Jones), K. 420
 Fraughnaugh, K. 550
 Fredman, M. L. 92, 823
 Freund, R. M. 807, 809
 Frick, F. 815
 Friedgut, E. 503, 509–10
 Friedland, S. 510, 736
 Frieze, A. 657, 722
 Fritsch, G. 399
 Fritsch, R. 399
 Frobenius, G. 181, 189–90, 207,
 256
 Fronček, D. 684
 Fujita, S. 373, 457
 Fulkerson, D. R. 222, 300, 302,
 370, 518, 532, 534, 547
 Fulton, W. 189
 Füredi, Z. 442, 479, 730
 Fuss, N. 42
 Gabber, O. 779
 Gabow, H. N. 246, 282
 Gaddum, J. W. 344
 Gale, D. 285, 288, 803–4, 813,
 820
 Galil, Z. 246, 779
 Gallai, T. 260, 263–4, 269, 273,
 275–6, 322, 334, 339, 354–5,
 357, 460, 548
 Gallian, J. A. 103, 646
 Galperin, G. 61
 Galvin, D. 504, 506, 509
 Galvin, F. 228, 355, 363–4, 474
 Ganter, B. 441
 Gardner, M. 143
 Garey, M. R. 11, 701, 795, 800
 Gargano, L. 327, 334
 Gaskell, R. W. 389
 Gasparyan, G. S. 369
 Gauchman, H. 61
 Gavlas, H. 646
 Gavril, F. 373
 Gazit, H. 397
 GCHQ Problem Solving Group
 149
 Geetha, J. 373
 Gehrlein, W. G. 823
 Geller, D. 418
 Genest, F. 273
 George, J. C. 273, 371, 764
 Georges, J. P. 317
 Gerbner, D. 493
 Gerencsér, L. 460
 Gerke, S. 488
 Gervacio, S. V. 249, 418, 819
 Gessel, I. M. 102, 106, 115, 117,
 129, 165, 167–9
 Getz, M. 61
 Ghouila-Houri, A. 334, 550
 Gilbert, E. N. 564, 688
 Gilmore, P. C. 374, 549
 Ginibre, J. 596
 Ginzburg, A. 764
 Glaisher, J. 142, 148
 Gleason, A. M. 449
 Glebov, A. N. 414
 Glock, S. 640, 647
 Goddard, W. 418
 Godfrey, J. 511
 Godsil, C. 500, 766, 781
 Goethals, J. M. 744
 Goldberg, C. H. 809
 Goldberg, M. K. 237, 360
 Goldman, J. R. 127, 175
 Golomb, S. W. 29, 622
 Golovach, P. A. 342
 Golovina, L. I. 419
 Golumbic, M. C. 366, 370, 582,
 831–2
 Gonçalves, D. 421
 Gondran, M. 287
 Good, I. J. 239
 Goodman, A. W. 238, 477
 Goodman, S. 330
 Gorgos, I. M. 374
 Gosper, R. W., Jr. 89
 Gottschalk, W. H. 468
 Gould, H. W. 23, 30, 65
 Gould, R. J. 215, 314, 316, 327,
 393, 491
 Goulden, I. P. 42
 Govorčín, J. 297
 Gowers, W. T. 466, 484, 672
 Grable, D. A. 745
 Graham, N. 428, 441, 565, 584
 Graham, R. L. 24, 33, 41, 61, 89,
 101, 341, 394, 425, 431, 442,
 446, 452, 460, 463–5, 470,
 473, 484, 500, 508–9, 559–60,
 597, 604, 673, 771, 781, 800
 Grauman, T. 457

- Graver, J. E. 449, 451
 Gravier, S. 356
 Greene, C. 190, 205, 208, 496,
 511, 539, 548, 551, 555, 561,
 565, 607
 Greene, J. E. 811–2
 Greenwell, D. L. 329
 Greenwood, R. E. 449
 Gregory, D. A. 771
 Griffiths, S. 682
 Griggs, J. R. 144–5, 152, 511,
 550, 557, 561, 568, 702
 Grimmett, G. R. 666, 701
 Grinberg, E. J. 400
 Grinstead, C. M. 449, 451
 Grolmusz, V. 731
 Grone, R. 776
 Gross, J. L. 377
 Gross, O. A. 370
 Grötzsch, H. 414
 Grünbaum, B. 387, 389, 423
 Grytczuk, J. 403, 680, 742
 Guan, M. 287
 Guldán, F. 412
 Gunderson, D. S. 473, 479, 491
 Guo, S. 473
 Gupta, H. 176
 Gupta, R. P. 358–9, 372
 Gurgel, M. A. 327
 Gusfield, D. 286
 Gustavsson, T. 640
 Gutin, G. 334
 Gutner, S. 402, 420
 Gutowski, G. 742
 Guy, R. K. 64, 105, 632, 792–3,
 795, 797–8
 Gyárfás, A. 262, 351–2, 357,
 460, 472, 474, 686
 Györi, E. 312
- Haase, A. 815
 Habib, M. 657
 Hadamard, J. 618–9, 805
 Hadwiger, H. 349, 729, 815, 817
 Haemers, W. H. 766, 771–2
 Hagelstein, P. 461
 Häggkvist, R. 326
 Haigh, J. 144
 Hajek, B. 765
 Hajnal, A. 343, 490–1
 Hajnal, P. 432, 442, 581, 604
 Hajós, G. 355, 709
- Haken, W. 402, 406
 Hakimi, S. L. 221, 238, 255, 261,
 326, 354, 746
 Hales, A. W. 467, 474
 Halin, R. 310
 Hall, M. 254–5, 262, 637
 Hall, M., Jr. 622, 637
 Hall, P. 254
 Halldórsson, M. M. 684
 Halmos, P. R. 254
 Hamburger, P. 580
 Hamidoune, Y. O. 734, 746
 Hamilton, W. 65
 Hammar, M. 327, 334
 Hammersley, J. M. 821
 Hanani, H. 398, 639, 641, 656
 Hanlon, P. 587
 Hansel, G. 496, 557
 Hansen, H. M. 373
 Hanson, D. 273, 373
 Harary, F. 135, 184, 187, 215–6,
 224, 228, 237, 290, 295, 297,
 329, 343, 398, 412, 428, 454,
 541, 565, 584, 666, 677, 690,
 765, 780, 794, 797–8
 Hardy, G. H. 140
 Harper, L. H. 496, 559–60,
 563–4, 567, 720, 800
 Harris, A. J. 362, 373
 Hartke, S. G. 276
 Hartman, I.B.-A. 549
 Hartsfield, N. 778
 Harzheim, E. 551
 Hasse, M. 339
 Havel, I. 373
 Havel, V. 221
 Havet, F. 412–3
 Haxell, P. 790
 Haxell, P. E. 455, 492, 677
 Hayes, P. J. 80
 Hayward, R. B. 375
 He, Q. 373
 Heawood, P. J. 399, 402, 419
 Hebbare, S. P. R. 656
 Hebdige, M. 414
 Hedayat, A. S. 651
 Hedetniemi, S. 330, 417–8
 Heffter, L. 645
 Heilbronn, H. 734
 Hell, P. 327, 334, 457
 Henning, M. A. 263, 274, 638
 Heppes, A. 817
- Herden, D. 461
 Herrendörfer, G. 655
 Herzog, M. 512
 Heule, M. J. 342
 Hierholzer, C. 234
 Hilbert, D. 461, 473
 Hill, C. 34
 Hillier, J. A. 246
 Hilton, A. J. W. 65, 359, 496–7,
 499, 501, 511–2, 607
 Hilton, P. 41
 Hind, H. 373, 681
 Hindman, N. 439, 466
 Hinrichs, A. 817
 Hiraguchi, T. 571, 574–5, 583
 Hladký, J. 347
 Hliněný, P. 795
 Ho, C.-C. 144–5, 152
 Hoare, A. H. M. 152
 Hobby, C. R. 810
 Hochberg, R. 801–3
 Hoeffding, W. 708, 715, 722
 Hoffman, A. J. 222, 244, 374,
 549, 772, 775, 781
 Hoffman, D. G. 647
 Hoggatt, V. E., Jr. 59, 61
 Holland, F. 23, 117
 Holley, R. 597
 Hollingsworth, S. 248
 Holton, D. 326
 Holton, D. A. 213
 Holyer, I. 359, 699
 Holzman, R. 665
 Holzmann, C. A. 541
 Hook, J. 459
 Hopcroft, J. E. 283–4, 393
 Horadam, A. F. 61
 Horák, P. 344, 373
 Horsley, D. 646
 Horton, J. D. 317, 330
 Hosoya, H. 765
 Hoşten, S. 580
 Howard, F. T. 48
 Hsieh, W. N. 563
 Hsu, D. F. 343
 Hsu, W.-L. 393
 Huang, D. 152
 Huang, H. 771
 Hulett, H. 238
 Huneke, C. 776
 Hurlbert, G. H. 828
 Hutchinson, J. P. 394, 419, 429

- Huxley, M. 730
 Hwang, K.-W. 731
- Igusa, K. 144, 152
 Imase, M. 296
 Ionin, Y. 178
 Irving, R. W. 286
 Isaacs, R. 372
 Isaak, G. 459, 624
 Ishigami, Y. 482
 Itai, A. 249, 315
 Ito, T. 244, 775
 Ivanova, A. O. 412
- Jackson, B. 318, 321, 326
 Jacobi, C. G. J. 129
 Jacobson, M. S. 249, 318, 327, 374
 Jaeger, F. 797
 Jahanbekam, S. 262, 273, 333, 422, 668
 Jamison, R. E. 374, 472–3, 735
 Janson, S. 657, 696, 708
 Janssen, J. C. M. 362–3
 Jarník, V. 246, 252
 Jendrol', S. 407, 411
 Jensen, T. R. 335
 Jenssen, M. 461
 Jerrum, M. 754
 Jewett, R. I. 467, 474
 Jiang, T. 471, 473, 685
 Jiang, Z. 479
 Jichang, S. 567
 Johannson, K. R. 466
 Johnson, D. M. 654
 Johnson, D. S. 11, 701, 795, 800
 Johnson, N. L. 106
 Johnson, P. 344
 Johnson, R. T. 503
 Joichi, J. T. 175
 Jolivet, J.-L. 334
 Jones, D. 61
 Jonsson, J. 387
 Joos, F. 647
 Jordan, C. 243, 251, 669
 Joret, G. 680
 Jorza, A. 388
 Joyal, A. 37, 127
 Józsa, S. 794
 Juarez, H. A. 794
 Jukna, S. 493
 Jungnickel, D. 609
- Juvan, M. 60, 412, 739
- Kabela, A. 318
 Kahn, J. 362, 439, 503, 510, 576, 578, 817–8, 823–6, 831
 Kainen, P. C. 399, 418–9, 794, 797–8
 Kaiser, T. 237, 318, 326
 Kalai, G. 503, 736, 817–8
 Kalbfleisch, J. D. 458
 Kalbfleisch, J. G. 449, 458
 Kamat, V. M. 503
 Kampen, G. R. 786
 Kaneko, A. 249, 819
 Kano, M. 268, 273, 457
 Kantor, W. M. 699
 Kantrowitz, M. 61
 Kapoor, S. F. 227, 273
 Karaganis, J. J. 331
 Karaivanov, B. 35
 Kardoš, F. 765
 Karger, D. R. 246
 Karoński, M. 657
 Karp, R. M. 11, 283–4
 Kárteszi, F. 639
 Kasteleyn, P. W. 596, 755–6
 Kászonyi, L. 491
 Katchalski, M. 442
 Katerinis, P. 276, 318
 Katona, G. O. H. 490, 495–8, 511, 554, 565
 Kauers, M. 174
 Kaul, H. 819
 Kawarabayashi, K.-i. 316
 Kearnes, K. A. 665
 Keedwell, A. D. 610, 623
 Keevash, P. 475, 496, 640, 682
 Keller, G. 587, 604
 Keller, N. 503
 Kellogg, A. 177
 Kelly, D. 571–3, 583, 606
 Kelly, J. B. 434
 Kelly, L. M. 434
 Kelmans, A. K. 297, 393, 777–8, 782
 Kempe, A. B. 213, 399
 Kendall, M. G. 228
 Kerimov, A. 315
 Kerov, S. V. 722, 821
 Kervaire, M. 745
 Keselman, G. 116
 Kézdy, A. E. 318, 746
- Khan, M. A. 133
 Kharaghani, H. 622
 Khare, C. B. 440
 Kierstead, H. A. 50, 248, 352, 355–6, 457, 584, 742
 Kim, J. 647, 668
 Kim, J. H. 451, 664, 682, 823
 Kim, S.-J. 423–4
 Kimble, R. J., Jr. 187
 King, A. D. 685, 765
 Kinnersley, W. B. 457
 Kirchhoff, G. 37
 Kirdar, M. S. 152
 Kirkland, S. 34
 Kirkman, T. P. 612, 641, 649
 Kislicyn, S. S. 823
 Kiss, E. W. 665
 Klamkin, M. S. 389
 Klavžar, S. 70, 606
 Klazar, M. 432
 Klein, P. N. 246
 Kleitman, D. 509, 551, 558
 Kleitman, D. J. 40, 226, 431, 442, 493, 496, 500–1, 507, 511, 548, 550–1, 555, 558–9, 561, 563, 565–7, 580, 595–6, 607–8, 665, 749, 793, 797
 Klešč, M. 794
 Klotz, W. 393
 Klove, T. 22
 Kneser, M. 251, 811
 Knuth, D. 152
 Knuth, D. E. 10, 24, 33, 35, 41, 50, 61, 65, 81, 89, 92, 99, 101, 116, 122, 133, 176, 190, 193, 195, 198, 207–8, 286, 441, 567, 667, 669, 800
 Ko, C. 498
 Kobourov, S. G. 286
 Koch, J. 406
 Kochman, F. 62
 Kochol, M. 421, 424
 Koebe, P. 394
 Kohayakawa, Y. 455, 482, 488
 Köhler, E. 647
 Kollár, J. 633, 672
 Komlós, J. 226, 351, 451, 458, 481, 488, 492, 551, 663–4, 779, 823
 Komm, H. 571
 Konheim, A. G. 50

Author Index

935

- König, D. 256, 258–9, 359, 371, 531, 763
 Konjevod, G. 457
 Kopylov, G. N. 323
 Korshunov, A. D. 558
 Kortsarz, G. 684
 Kosek, P. M. 630
 Koshy, T. 53
 Kostochka, A. 434, 442
 Kostochka, A. V. 239, 248, 332, 355, 360, 364–5, 373–4, 413–4, 420, 460, 484, 504, 639, 672, 705, 710
 Kotz, S. 106
 Kotzig, A. 227, 264, 273, 276, 371, 411, 647
 Kouider, M. 273, 326–7
 Kouril, M. 465
 Kovács, P. 216
 Kovář, P. 239
 Kövari, T. 631, 672
 Kozik, J. 660, 673, 680, 742
 Kožuhin, G. I. 353
 Kraitchik, M. 66
 Král', D. 326, 347, 414, 457, 765
 Krasikov, I. 327
 Kratochvíl, J. 403
 Krattenthaler, C. 50, 170, 192
 Kratzke, T. 771
 Krivelevich, M. 672–3, 684
 Kriz, I. 341, 434
 Król, M. 419
 Krompart, L. B. 418
 Kronk, H. V. 329, 343
 Krueger, R. A. 460
 Kruskal, J. B. 245, 495–6
 Kruskal, J. B., Jr. 431
 Kruyswijk, D. 554
 Kubale, M. 335
 Kubesa, M. 239
 Kučera, L. 699, 718
 Kuczma, M. S. 24
 Kühn, D. 316, 488, 640, 647
 Kuhn, H. W. 280
 Kumbhat, M. 422
 Kummini, M. 329
 Kündgen, A. 287
 Kuo, E. H. 34
 Kuperberg, G. 34, 756
 Kupka, J. 49
 Kuratowski, K. 390
 Kuroda, S. 515
 Kynčl, J. 457
 Labelle, G. 129
 Laghate, K. 104
 Lagrange, J. L. 129
 Lai, H.-J. 540
 Lam, C. W. H. 612
 Lamé, G. 67
 Landau, E. 10
 Landau, H. G. 225, 228, 261
 Lander, E. S. 623, 637
 Landman, B. M. 425
 Langley, L. 550
 Larman, D. G. 461, 724, 729
 Larsen, M. 34
 Las Vergnas, M. 272, 333
 Lassak, M. 817
 Lavallée, I. 80
 Lawler, E. L. 282, 439, 533
 Lawrence, J. 355
 Lawrence, S. L. 460
 Laywine, C. F. 623, 656
 Lazarson, T. 538
 Le, V. B. 370
 Lebesgue, H. 422
 Lederberg, J. 418
 Lee, C. 457, 484, 488, 551, 672
 Lee, O. 315
 Lefmann, H. 471, 601
 Lefschetz, S. 807
 Lehel, J. 249, 318, 472
 Lehman, A. 529, 540
 Lehmer, D. H. 65
 Leighton, F. T. 793
 Leiserson, C. E. 809
 Lekkerkerker, C. G. 61
 Lempel, A. 343
 Lenz, H. 609
 LeSaulnier, T. 441
 Lesniak, L. M. 215, 250, 273, 315–6, 327, 377
 Letzter, S. 460
 Leuck, D. H. 175
 Levin, G. M. 664
 Levy, L. 80
 Lewinter, M. 215
 Lewis, J. T. 429
 Li, C. M. 790
 Li, H. 316
 Li, Q. 801, 819
 Li, S.-Y. R. 740
 Li, W. C. W. 740
 Li, X. 457
 Li, X. L. 312
 Li, Z. 414
 Lick, D. R. 312
 Liggett, T. M. 512
 Lih, K.-W. 287, 413
 Lin, C.-Y. 287
 Lindner, C. C. 609, 641
 Lindström, B. 165, 167, 169, 496, 557
 Ling, A. C. H. 473
 Linial, N. 207, 323, 549, 823–5
 Liouville, B. 292
 Lipski, W., Jr. 566
 Lipton, R. J. 394–6, 399
 Littlewood, D. E. 207
 Liu, B. 236
 Liu, C. L. 17
 Liu, H. 460
 Liu, J. 262
 Liu, R. 354
 Liu, Z. H. 326
 Livingston, M. 584
 Lloyd, E. K. 37, 46
 Lo, A. 327, 334, 640
 Locke, S. C. 227, 229, 330
 Loeb, D. E. 144
 Loeb, S. 422
 Logan, B. F. 722, 821
 Long, C. T. 62
 Longyear, J. Q. 776
 Loomis, L. H. 514
 Lossers, O. P. 129
 Loten, C. O. M. 273, 373
 Lovász, L. 47, 104, 229, 232, 249, 262–4, 272, 275–6, 302, 308, 310, 312, 342, 355, 368–9, 375–6, 419, 434, 436, 456–7, 461, 477–8, 491, 495–7, 503, 510–1, 533, 607–8, 668, 675, 679, 726, 756, 762, 764, 812
 Lu, L. 491
 Lu, X. 322, 566
 Lubell, D. 34, 558
 Lubotzky, A. 341, 434, 780
 Lucas, F. E. A. 47, 162, 238
 Luce, R. D. 585
 Łuczak, T. 455, 657, 696, 708
 Luecker, G. S. 393
 Lukot'ka, R. 237
 Luks, E. M. 699

- Luo, R. 423
 Lützen, J. 740
 Lyusternik, L. A. 810
- Ma, M. 371
 Mabry, R. 417
 MacLane, S. 515, 530
 MacMahon, P. A. 45, 149, 169, 178, 207
 MacNeish, H. F. 611
 Maddox, R. 782
 Madej, T. 832
 Mader, W. 264, 296, 308–11, 315–6, 350–1, 353, 710
 Maffray, F. 356
 Magnant, C. 457
 Magnanti, T. L. 501, 539
 Mahdian, M. 237
 Mahlbürg, K. 664
 Mahmoodian, E. S. 237
 Mahmoodian, S. E. 329, 343, 371, 398
 Maillet, E. 623
 Majumdar, K. N. 730
 Malgrange, Y. 393
 Mann, H. B. 254, 623, 637
 Mantel, W. 224, 475
 Mao, J. 237
 Marcus, A. 432–3
 Marcus, M. 257, 765
 Margulis, G. A. 779–80
 Marica, J. 512
 Markowsky, G. 558, 580
 Martin, M. H. 763
 Martin, R. 488
 Martinov, N. 313
 Massey, J. L. 507
 Matoušek, J. 723, 804, 806, 810, 812–3
 Matoušek, J. 461
 Matsko, V. J. 565
 Matsuda, H. 327
 Matthews, M. M. 326, 330
 Matula, D. W. 297, 353–4, 700, 718
 Maunsell, F. G. 264
 Maurer, R. 106
 Maurer, S. 228, 584
 McAndrew, M. H. 222
 McCarthy, J. 667
 McConnell, R. M. 573
- McDiarmid, C. J. H. 372, 657, 685, 701, 706, 719, 721, 801–3
 McFarland, R. 637
 McGuinness, S. 424
 McKay, B. D. 449, 697
 McKee, T. A. 239, 374
 McMorris, F. R. 374
 McSorley, J. P. 765
 Meagher, K. 500, 781
 Melham, R. S. 60
 Mel'nikov, L. S. 414
 Melolidakis, C. 669
 Mendelsohn, N. S. 654
 Menger, K. 298, 300
 Merca, M. 148, 150
 Merris, R. 776, 782
 Meshalkin, L. D. 558
 Meszka, M. 239
 Meyniel, H. 375
 Miao, L. 414
 Micali, S. 284
 Micek, P. 680
 Mihók, P. 418
 Miklós, D. 501, 512
 Mikola, M. 65
 Milans, K. G. 457, 602, 608, 668, 685
 Milgram, A. N. 548
 Miller, E. 784
 Miller, E. W. 569–70, 831
 Miller, G. L. 397
 Miller, Z. 343, 819
 Mills, G. 463
 Mills, W. H. 514
 Milman, V. D. 778–80
 Milner, E. C. 499, 511
 Milutinović, U. 70
 Minoux, M. 287
 Minty, G. J. 338, 540
 Mirkin, B. G. 586
 Mirsky, L. 518, 547
 Mirzakhani, M. 402, 421
 Mitas, J. 587
 Mitchem, J. 326
 Mitzenmacher, M. 708
 Moessner, A. 62
 Moews, D. 668
 Mogyoródi, J. 105
 Mohanty, S. G. 50
 Mohar, B. 60, 377, 412, 739, 776, 795, 797
 Möhring, R. H. 573
- Molloy, M. 335, 362, 373, 657, 668, 674, 677, 681, 685–6, 702, 706, 721–2
 Monjardet, B. 586
 Montágh, B. 50
 Montellano-Ballesteros, J. J. 457
 Montgomery, B. 424
 Montgomery, R. 640, 646
 Montmort, P. R. 162
 Moon, J. W. 37, 47, 251, 325, 332–4, 477, 489, 491, 703, 721
 Moore, B. R. 354
 Moore, E. H. 610–1, 641
 Moore, J. I., Jr. 573, 583
 Morávek, J. 373
 Morris, R. 460, 682
 Morris, W. 446
 Morris, W. D., Jr. 446, 580
 Moser, L. 59, 325, 332, 441, 477, 514, 703
 Moser, R. A. 680
 Moshkovitz, G. 602–3
 Motwani, R. 657
 Motzkin, T. S. 42, 387, 389, 489, 781
 Mozhan, N. N. 354
 Mubayi, D. 451, 457, 460, 471, 478, 500, 686
 Muir, T. 764
 Mulder, H. M. 253, 274, 374
 Mullen, G. L. 623, 656
 Mullin, R. 123
 Munkres, J. 280
 Murty, U. S. R. 215, 228, 330, 489, 639
 Mycielski, J. 340
 Myers, B. R. 65, 354
 Myrvold, W. 393
- Naatz, M. 312, 764
 Nagasawa, T. 797
 Nagy, Z. 459, 728, 745
 Nakada, H. 296
 Nakasawa, T. 515
 Nakayama, A. 678
 Narayan, D. A. 624
 Narayana, T. V. 45
 Narayanan, B. 765
 Narayanan, N. 373
 Nasar, S. 803
 Naserasr, R. 373

Author Index

937

- Nash, E. D. 630
 Nash-Williams, C. St. J. A. 541
 Naslund, E. 504
 Nathanson, M. B. 734–5, 745–6
 Nemhauser, G. L. 521
 Nešetřil, J. 425, 434, 436–7, 455, 457, 472, 511, 543, 726
 Netto, E. 41
 Neumann-Lara, V. 327, 457
 Newborn, M. M. 793
 Newman, M. 765
 Nicolescu, L. I. 22
 Niessen, T. 273, 359
 Nijenhuis, A. 190
 Nikiforov, V. 454, 478, 482, 770
 Nikšić, F. 133
 Nilli, A. 780, 817–8
 Nishimura, H. 515
 Niu, Y. Y. 292
 Niven, I. 107
 Noel, J. A. 355–6
 Noguchi, K. 797
 Nordhaus, E. A. 344
 Norine, S. 765
 Norman, R. Z. 263
 Novelli, J.-C. 192
 Nyblom, M. 172
- O, S. 237, 274, 334, 668
 O'Hara, K. M. 557
 Ohba, K. 355
 Ohtsuka, H. 33
 Olmsted, C. 176
 Olson, E. J. 823
 Ordaz, O. 321
 Ore, O. 249–50, 258, 260, 319, 321, 332–3, 355, 359–60, 387, 399, 420, 532, 571
 O'Rourke, J. 394
 Osthus, D. 316, 488, 640, 647
 Ota, K. 355
 Owens, A. B. 389
 Oxley, J. G. 515, 526
 Ozeki, K. 327, 334, 457
 Özkahya, L. 239
- Paasche, I. 62
 Pach, J. 457, 461, 491, 601, 783, 793, 795, 797
 Pak, I. 141–2, 152, 192
 Palacios, J. L. 66, 668
 Paley, R. E. A. C. 621
- Palmer, C. 484, 488
 Palmer, E. M. 135, 657, 700, 703, 705
 Palumbíny, D. 249
 Panconesi, A. 706, 721
 PanduRangan, C. 374
 Papadimitriou, C. H. 521
 Park, W.-J. 424
 Parker, E. T. 612, 652–4
 Parreau, A. 680
 Parsons, T. D. 776
 Patashnik, O. 24, 33, 41, 61, 89, 101
 Paterson, M. S. 815
 Patkós, B. 493
 Paul, J. L. 465
 Paule, P. 66
 Paulraja, P. 326
 Payan, C. 670
 Peart, P. 64
 Peck, G. W. 42, 442, 771
 Pederson, J. 41
 Peled, U. 764
 Pelsmajer, M. J. 374, 795
 Peltsohn, R. 645
 Penaud, J. G. 418–9
 Penrice, S. G. 352
 Penrose, M. 783
 Pepe, V. 633
 Percus, J. K. 755
 Perfect, H. 518
 Perkovic, L. 359
 Perles, M. A. 546
 Péroche, B. 412, 678
 Perrett, T. 685
 Perron, O. 62
 Pertuiset, R. 393
 Perz, S. 369
 Peters, L. 458
 Petersen, J. 213, 267–8, 273–4, 277, 740
 Petersen, T. K. 101
 Petkovšek, M. 87, 89–90, 606
 Petr, C. 70
 Pettersson, W. 646
 Peyrat, C. 296
 Phillips, J. 711
 Phillips, R. 341, 434, 780
 Pikhurko, O. 479, 817
 Pilpel, S. 821
 Pinkham, R. S. 129
 Pinski, M. 779
- Piotrowski, W. L. 647
 Piotrowski, W.-L. 647
 Pippenger, N. 509, 779
 Pisanski, T. 330
 Pité, E. 133
 Pitman, J. 37
 Plantholt, M. 359
 Plaza, A. 80
 Plesnevič, P. S. 343
 Plesník, J. 267, 294, 296
 Pluhár, A. 421, 424
 Plummer, M. D. 253, 262, 268, 275, 297, 315–6, 401, 756, 764
 Pnueli, A. 343
 Pohoata, C. 174
 Pokrovskiy, A. 646
 Polimeni, A. D. 227, 272
 Poljak, S. 776
 Pollack, R. 783
 Pollak, H. O. 771, 781
 Pólya, G. 37, 128, 184
 Poonen, B. 503
 Popadić, M. S. 550
 Popescu, C. 172
 Pór, A. 580
 Porter, T. D. 764
 Pósa, L. 238, 273, 326, 333, 490
 Postle, L. 356, 414, 685
 Pournin, L. 387
 Powell, M. B. 337
 Prałat, P. 455, 704, 708
 Pratt, R. 22
 Preen, J. 386
 Prékopa, A. 105
 Prim, R. C. 246, 252
 Prince, N. 460
 Prins, G. 297
 Proctor, R. A. 147, 557
 Proding, H. 49, 64
 Prömel, H. J. 425
 Propp, J. G. 34, 387, 511
 Prowse, A. 740
 Prüfer, H. 37
 Pudaite, P. R. 66
 Pudlák, P. 504
 Puleo, G. J. 372
 Pultr, A. 511, 726
 Pyber, L. 249, 737
 Pyke, R. 50
 Pym, J. S. 299
- Qiao, P. 249

- Quinn, J. J. 53, 664
- Rabern, L. 336
- Rabin, M. 263
- Rabinovitch, I. 228, 574, 583–4, 604
- Rademacher, H. 140
- Radhakrishnan, J. 504, 508, 510, 660, 673
- Rado, R. 451, 456, 462, 466–8, 470, 498, 503–4, 520, 608
- Radoux, C. 177
- Radziszowski, S. P. 449
- Raghavan, P. 657
- Raĭgorodskii, A. M. 817
- Ramalingam, G. 374
- Ramamurthi, R. 287, 746
- Ramanan, G. V. 730
- Ramanujan, S. 140
- Ramirez-Alfonsin, J. 657
- Ramírez-Alfonsín, J. L. 368, 370
- Ramos, E. A. 815
- Ramras, M. 295
- Ramsey, F. P. 443–4, 468
- Randerath, B. 273
- Raney, G. N. 50, 129
- Rasch, D. 655
- Raspaud, A. 414
- Rautenbach, D. 275
- Ray-Chaudhuri, D. K. 370, 647, 649, 731
- Raynaud, H. 460
- Razborov, A. A. 475, 478, 491, 504
- Read, R. C. 374
- Rechnitzer, A. 433
- Rédei, L. 334
- Redfield, J. H. 184
- Ree, R. 257
- Reed, B. A. 335, 339, 355, 359, 362, 370, 373, 657, 668, 674, 677, 681, 685–6, 702, 706, 721–2
- Rees, D. 239
- Regev, A. 433
- Reiher, C. 478
- Reiman, I. 632
- Reiniger, B. 434, 442
- Remmel, J. B. 36, 192
- Renaud, J.-C. 503, 512
- Renault, M. 40
- Rényi, A. 37, 99, 105, 133, 244, 252, 514, 632, 687, 698–9
- Reuter, K. 572, 584
- Révész, P. 817
- Rey, J. G. 47
- Reznick, B. 771
- Ribó Mor, A. 783
- Rice, J. R. 810
- Richter, C. 817
- Richter, R. B. 489, 794
- Riddell, R. J. 135
- Riddell, R. J., Jr. 127
- Riesling, A. S. 817
- Rieß, W. 557
- Riguet, J. 605
- Ringeisen, R. D. 794, 798
- Ringel, G. 218, 646, 656
- Riordan, J. 47, 50, 65, 133, 153, 161
- Rivera-Campo, E. 327
- Robbins, H. 306
- Roberts, F. S. 337
- Roberts, J. A. 459
- Roberts, S. M. 449
- Robertson, A. 425
- Robertson, J. M. 389
- Robertson, N. 349, 370, 406, 416–7
- Robinson, G. de. B. 190, 193, 195
- Robinson, J. P. 820
- Rodeh, M. 249
- Rodger, C. A. 609, 641, 647
- Roditty, Y. 236, 327
- Rödl, V. 425, 434, 436–7, 455, 471–3, 483–4, 488, 543, 581, 604, 672, 737
- Rodney, P. 794
- Rogers, C. A. 724, 729
- Rogers, D. 64
- Rolewicz, S. 369
- Rollová, E. 237
- Roman, S. M. 123, 632
- Rónyai, L. 633, 672
- Rosa, A. 641, 646–7, 656
- Roselle, D. P. 177
- Rosenfeld, M. 326, 373
- Rota, G. C. 521, 530
- Rote, G. 783
- Rotem, D. 582
- Roth, K. F. 484–5
- Rothschild, B. L. 425, 452, 463–5, 470
- Rotman, J. J. 238
- Rousseau, C. C. 455, 459
- Roussel, F. 370
- Roy, B. 339
- Royle, G. 226, 766
- Rubel, L. A. 473
- Rubin, A. L. 346, 348, 356, 660, 667
- Ruciński, A. 484, 657, 673, 696, 703, 708
- Rupp, C. A. 178
- Rusin, D. J. 103
- Rusu, I. 370
- Rusza, I. 734–5, 745–6
- Ruszinkó, M. 460
- Ruzsa, I. Z. 485, 492, 684
- Ryjáček, Z. 320, 326
- Ryjáček, Z. 320
- Rymer, N. W. 66
- Ryser, H. J. 227–8, 254, 314, 616, 627, 637
- Saaty, T. L. 399, 418
- Saberi, A. 237
- Sabidussi, G. 343, 740
- Sachs, H. 34, 219, 251, 274, 338–9, 739, 766, 780–1
- Sadri, B. 237
- Sagan, B. 207
- Sagan, B. E. 177, 189, 766, 823
- Saito, A. 318, 321
- Šajna, M. 646
- Sakamoto, J. 355
- Saks, M. E. 548–9, 801–3, 823–4, 826, 831
- Salamon, G. 334
- Salavatipour, M. R. 414
- Salazar, G. 794
- Salehi Nowbandegani, P. 334
- Salgado, E. 414
- Salmon, A. 356
- Samad, T. 353
- Sandell, D. P. 668
- Sanders, D. 406, 416–7
- Sanders, D. P. 414–6, 422–3
- Sanders, P. R. 466
- Sands, A. D. 50
- Santoro, N. 832
- Saritzky, N. 344
- Sarkaria, K. S. 812

Author Index

939

- Sárközy, G. N. 481
 Sarnak, P. 341, 434, 780
 Sarvate, D. G. 503, 512
 Sauer, N. 248, 476
 Sauv , L. 477
 Savage, C. D. 312
 Sawin, W. F. 504
 Scarpis, U. 622
 Schaal, D. 473
 Schacht, M. 455, 485, 488
 Schaefer, M. 795
 Sch uble, M. 354
 Schaudt, O. 503
 Schauz, U. 347, 741
 Scheim, D. E. 740
 Scheinerman, E. R. 394, 828–32
 Schellenberg, P. J. 647
 Schelp, R. H. 262, 327, 454–5, 472–3
 Schensted, C. 193, 195, 198, 206
 Schiermeyer, I. 320
 Schl fli, L. 48
 Schmeichel, E. F. 318, 326, 330, 354
 Schmidt, F. W. 105, 134, 152, 188, 442
 Schmitt, J. R. 276
 Schmuland, B. 176
 Schnyder, W. 394, 783, 790
 Sch nberger, T. 267
 Sch nheim, J. 490, 497, 512, 607
 Schramm, O. 817
 Schrijver, A. 277, 521, 534, 541, 735, 813–4
 Schr der, E. 47, 64, 81, 135
 Schulz, A. 783
 Schur, I. 462, 473
 Schuster, S. 251, 273
 Sch tzenberger, M.-P. 99, 101, 106, 127, 129, 177, 197–8, 203, 206, 208, 496, 616
 Schwenk, A. J. 187, 206, 620–1, 624, 782, 794, 798
 Schwer, S. R. 28, 31, 41
 Scott, A. 488
 Scott, A. D. 352
 Scott, D. 587
 Scoville, R. A. 177
 Scully, D. 152
 Seberry, J. 622
 Sedl cek, J. 65
 Segner, J. A. 41
 Seidel, J. J. 724, 744
 Seidenberg, A. 430
 Seinsche, D. 375, 490
 Sekanina, M. 331
 Selkow, S. M. 699, 705
 Sereni, J.-S. 412
 Serrano, L. G. 42
 Servedio, R. 144
 Seymour, P. 349, 406, 416–7
 Seymour, P. D. 314, 349, 370, 396–7, 416, 497, 531, 607–8
 Shamir, E. 717
 Shannon, A. G. 60, 65
 Shannon, C. E. 358, 360, 365, 372
 Shapira, A. 488, 602–3
 Shapiro, H. S. 514
 Shapiro, L. W. 48, 64–5, 82
 Shapley, L. S. 285, 288
 Sharir, M. 783
 Sharp, H., Jr. 261
 Shearer, J. 507
 Shearer, J. B. 508–9, 566–7, 663, 675, 682
 Sheehan, J. 213, 459
 Sheikh, N. 460
 Shelah, S. 466, 551
 Shen, Y. Q. 801, 819
 Shepp, L. A. 599, 608, 722, 821
 Shi, R. H. 326
 Shieh, B.-S. 292
 Shih, W.-K. 393
 Shirazi, H. 737, 746
 Shlosman, S. B. 810
 Shnirel'man, L. 810
 Shokoufandeh, A. 488
 Shor, P. 442
 Shpilka, A. 504
 Shreve, W. E. 249
 Shrikhande, S. S. 612, 616, 623, 651–4
 Sidney, J. B. 828, 832
 Sidney, S. J. 828, 832
 Silwal, S. 226
 Simion, R. 442
 Simonovits, M. 457, 478–9, 482, 488, 490, 492, 684
 Simonyi, G. 474
 Sinclair, A. 680, 754
 Singhi, N. M. 728
 Singleton, R. R. 244, 639, 775
 Singmaster, D. 70, 388
 Skokan, J. 461, 488
 Skolem, T. 641, 644
 Škrekovski, R. 60, 239, 412, 424, 639, 739
 Skyrme, T. H. R. 152
 Sleator, D. D. 387
 Slivnik, T. 364
 Sloane, N. J. A. 318, 651
 Smith, B. B. 228
 Smith, C. A. B. 752
 Smith, H. J. S. 177
 Smolenskii, E. A. 250
 Smoot, N. 148
 Snevily, H. St. C. 50, 502, 730, 746
 Soderberg, S. 514
 Sofair, I. 174
 Soifer, A. 342, 425
 Soltan, V. 446
 Solymosi, J. 492
 Somasundaram, K. 373
 Sondow, J. 32
 Soneoka, T. 296
 Song, Z. M. 316
 Sorel, J. 33
 S rensen, B. A. 345
 S s, V. T. 244, 457, 631–2, 672, 684
 Špacapan, S. 292, 297
 Spencer, J. 248, 425, 452, 454, 463, 465, 470, 504, 567, 576, 579–80, 584, 657, 662–3, 666, 669, 672–5, 682, 685, 688, 696, 702, 706, 717, 721–2, 780, 794
 Spencer, T. 246
 Sperner, E. 496, 558, 561, 799, 802, 805
 Spinrad, J. P. 370, 573
 Spitzer, F. 50
 Srinivasan, A. 660, 673, 684
 Stacho, L. 327, 334
 Stahl, J. 568
 Stanley, R. P. 41–2, 48, 61, 76, 81, 93, 102, 116, 127, 129, 132, 135–6, 145, 150, 177, 189, 206–8, 261, 557, 564–5, 606, 669, 761, 766, 824, 827
 Stanton, D. 100
 Stanton, R. 458
 Stathopoulos, D. 62, 135
 Staton, W. 238

- Steele, J. M. 430, 669
 Štefanovič, D. 795
 Steger, A. 488
 Steiglitz, K. 521
 Stein, S. K. 387, 393
 Steiner, J. 48, 641
 Steinlein, H. 806, 815
 Stevens, W. L. 610
 Stewart, M. J. 272
 Stiebitz, M. 239, 346, 354, 639, 739
 Stinson, D. R. 609, 612, 647
 Stirzaker, D. R. 666
 Stobert, I. 794
 Stocker, C. 457
 Stockmeyer, P. K. 92
 Stolee, D. 276, 422, 602, 608
 Stone, A. H. 479, 491
 Stong, R. 330, 343, 461, 623
 Stout, Q. F. 584
 Stoyanovskii, A. V. 192
 Straus, E. G. 489, 781
 Strehl, V. 31
 Stufken, J. 651
 Sturtevant, D. 507
 Subba Rao, K. 60
 Sudakov, B. 334, 355, 425, 451, 453, 457, 459–60, 484, 551, 601, 608, 646, 672–3, 677, 684, 731
 Suk, A. 446, 451, 457, 601
 Sulanke, R. A. 28–9, 34, 62, 64
 Sumner, D. P. 272–3, 326, 330, 351
 Sun, Q. 414
 Sun, Z.-W. 473
 Sunder, V. S. 776
 Suppes, P. 587
 Suzuki, H. 728, 731
 Suzuki, Y. 797
 Sved, M. 40
 Swiercz, S. 612
 Sýkora, O. 798
 Sylvester, J. J. 37, 141–2, 618
 Sysło, M. M. 819
 Szabó, T. 633, 672
 Szász, D. 105
 Szegedy, M. 674
 Székely, L. A. 47, 135, 428, 441, 794, 798
 Szekeres, G. 338, 344, 430, 446, 458
 Szele, T. 666
 Szemerédi, E. 226, 250, 351–2, 357, 451, 455, 480–1, 483–5, 488, 492, 504, 663–4, 684, 737, 779, 793–4, 798
 Szpilrajn, E. 569
 Szűcs, A. 810
 't Woord, A. N. 32
 Tagiuri, A. 61
 Tait, P. G. 399–400
 Talagrand, M. 712, 720
 Tamassia, R. 394
 Tanaka, Y. 803
 Tanner, R. M. 779
 Tao, M. Q. 801, 819
 Tao, T. 488, 680, 732
 Tardos, E. 310
 Tardos, G. 432–3, 491, 680
 Tarjan, R. E. 246, 282, 387, 393–6, 399
 Tarry, G. 612, 763
 Tarsi, M. 738–9, 746, 764
 Tashkinov, V. A. 736
 Tator, C. 575, 583
 Tauraso, R. 33, 81
 Tayfeh-Rezaie, B. 622
 Taylor, H. 91, 346, 348, 356, 660, 667
 Teirlinck, L. 441
 Telle, J. A. 512
 Thiel, L. 612
 Thieu, U. 173
 Thomas, R. 314, 349, 370, 396–7, 406, 414, 416–7, 471
 Thomason, A. 692
 Thomason, A. G. 242, 249–50, 318, 331–2, 351, 710
 Thomassé, S. 685
 Thomassen, C. 238, 262, 304–5, 313–4, 316, 326, 333–4, 350, 377, 392–4, 401–3, 414, 419, 685, 742, 794
 Thrall, R. M. 190, 192, 207
 Thuillier, H. 370
 Thurston, W. P. 387, 394
 Tian, F. 325–6
 Timmons, C. 422
 Tindell, R. 237
 Tiwari, P. 771
 Todd, M. J. 807, 809
 Toft, B. 273, 335, 345, 354, 373, 740
 Toida, S. 239
 Tokushige, N. 493
 Tollis, I. G. 394
 Tomescu, I. 355, 512, 667
 Tong, L.-D. 287
 Töröcsik, J. 461
 Tóth, G. 793, 795, 797
 Touchard, J. 127
 Tracy, P. 249
 Trotignon, N. 370
 Trotter, W. 794
 Trotter, W. T. 50, 228, 373, 442, 455, 483, 568, 572–3, 580–1, 583–4, 600, 604, 790, 794, 798, 823, 828, 832
 Trow, P. B. 429
 Tsai, M.-T. 419
 Tsai, S.-F. 551
 Tucker, A. W. 807, 809
 Tucker, T. W. 377
 Tuglu, N. 177, 766
 Tuinstra, H. 327
 Turán, P. 223, 475–6, 484, 489, 491, 631, 672
 Tutte, W. T. 242, 251, 264, 268–70, 276, 304–5, 314, 317, 330, 370, 392, 398, 401, 521, 536, 749, 752, 783
 Tuza, Z. 262–3, 339, 343–4, 352, 357, 403, 472, 491
 Tverberg, H. 378, 771
 Uhlenbeck, G. E. 127, 135
 Umans, C. 504
 Ungar, P. 175, 763
 Upfal, E. 708
 Urrutia, J. 582, 828, 832
 Vaccaro, U. 327, 334
 Valencia-Pabon, M. 251
 Valiant, L. G. 754
 Valicov, P. 373
 van Aardenne-Ehrenfest, T. 752
 van den Heuvel, J. 424
 van der Waerden, B. L. 463–4, 515, 521
 van Lint, J. H. 139, 609, 622, 639, 774
 van Tengbergen, E. 554
 Vanden Eynden, C. 92

Author Index

941

- Vandenbussche, J. 260
 Vander Meulen, K. N. 771
 Vandermonde, A.-T. 26
 Vapnik, V. N. 711–2
 Varma, B. N. 325
 Vassilev, M. 29
 Vassilev, T. S. 35
 Vaughan, E. R. 475
 Vaughan, H. E. 254
 Vaughan, T. P. 503
 Vazirani, V. V. 284, 754, 756
 Veldman, H. J. 318
 Venkannayah, K. 61
 Venkatesan, S. M. 397
 Vera, J.-C. 251
 Veršik, A. M. 722, 821
 Verstraëte, J. 479, 500
 Vestergaard, P. D. 327
 Viennot, G. 165, 167–9, 199–200
 Vigoda, E. 754
 Vijayaditya, N. 373
 Vince, A. 441, 703, 782
 Vitaver, L. M. 339
 Vizing, V. G. 237, 343, 346–7,
 355–6, 358–9, 362, 414,
 422–3, 699
 Voigt, M. 346, 402–3
 Volkmann, L. 215, 268, 296, 359
 Voloshin, V. I. 174, 374
 von Neumann, J. 257
 von Staudt, K. G. C. 387
 Voss, H.-J. 326
 Voss, H.-J. 407
 Vrt'ò, I. 798
 Škrekovski, R. 297
 Vu, V. 488
- Wagner, D. 647
 Wagner, K. 390, 393, 398, 528
 Wagon, S. 221, 343, 655
 Wakabayashi, Y. 327
 Wall, C. E. 227
 Wallis, W. D. 215, 609
 Walsh, T. R. 80
 Walter, J. R. 373
 Walters, I. C., Jr. 779
 Wang, D. L. 226, 501
 Wang, D.-W. 566
 Wang, E. T. 174
 Wang, J. F. 819
 Wang, P. 501
 Wang, R. 356
- Wang, W. 413
 Wang, Y. 503
 Wanless, I. M. 261
 Wardlaw, W. P. 116, 173
 Warning, E. 735
 Warren, H. E. 830
 Watanabe, M. 418–9
 Watkins, M. E. 313–4
 Watson, P. 389
 Weaver, W. 60
 Wegner, G. 496
 Wei, B. 473
 Wei, V. K. 263, 662
 Weinstein, J. M. 263
 Weiss, B. 50
 Welch, L. R. 29
 Welsh, D. J. A. 337, 515, 521,
 533, 539–40
 Welukar, R. M. 115
 Wendel, J. G. 669
 Wernicke, P. 406
 West, D. B. 50, 62, 152, 176,
 215, 237, 239, 260, 262,
 273–6, 326, 331–4, 353–4,
 356, 371, 374, 407, 411, 419,
 422, 434, 442, 457, 472,
 490–1, 493, 540, 550–1, 557,
 564–5, 567, 587, 596, 602,
 605, 608, 639, 668, 685, 705,
 731, 771, 782, 809, 819, 832
- West, Don. 106
 West, J. 442
 Westcott, P. 433
 Wetzal, J. E. 388, 565
 White, D. E. 100, 175, 566
 Whiting, P. D. 246
 Whitney, H. 158, 293, 300, 306,
 314, 380, 398, 401, 418,
 514–5, 521, 524, 527, 537
 Whitworth, W. A. 33, 40, 46, 115
 Wiedemann, W. H. 176
 Wiener, G. 334
 Wiener, N. 586, 605
 Wierman, J. C. 828
 Wilf, H. S. 87, 89–91, 112, 117,
 129, 135–6, 140, 190, 338,
 769, 775
 Will, T. G. 238
 Williamson, J. 622
 Williamson, S. G. 566
 Williford, J. 630
 Wilson, R. J. 37, 46, 361, 699
- Wilson, R. M. 459, 500, 609, 622,
 639–41, 647, 649, 727–9, 731
 Win, S. 327–8
 Win, Z. 327
 Winkler, P. 668, 821, 823
 Winkler, P. M. 221, 431, 600,
 608, 667, 781
 Wirth, B. 402
 Wismath, S. K. 394
 Witt, E. 467
 Woan, W.-J. 64
 Woeginger, G. J. 342
 Wojda, A. P. 326
 Wollan, P. 314
 Wolsey, L. A. 521
 Wong, C. K. 566
 Wood, D. 80
 Wood, D. R. 680
 Woodall, D. R. 323, 364–5,
 413–4, 539, 740, 793, 798
 Woolhouse, W. S. B. 641
 Wormald, N. 671, 704
 Wormald, N. C. 697, 704, 722
 Worpitzky, J. 101
 Wright, C. 823
 Wu, B. 413
 Wu, H. 334, 355–6
 Wu, J.-L. 412, 422
 Wu, Y.-W. 412
- Xiao, S. 24
 Xiao, Y. 65
 Xin, G. 442
- Yackel, J. 449, 451
 Yaglom, A. M. 24
 Yaglom, I. M. 24, 419
 Yamamoto, K. 558
 Yamashita, T. 316, 326–7, 334
 Yan, C. H. 50
 Yancey, M. 276, 355, 414, 420,
 422
 Yannakakis, M. 573, 754, 756
 Yao, A. C. C. 447–8
 Yao, B. 819
 Yao, F. F. 815
 Yap, H. P. 373, 654
 Yates, F. 612
 Yeh, Y. N. 144
 Yellen, J. 377
 Yeo, A. 263, 274, 638
 Yoshimoto, K. 327

942

Young, A. 189–90, 207
 Young, D. 461
 Yu, G. 423–4
 Yu, X. 134, 314–5, 421, 424
 Yu, Z. G. 326

Zabrocki, M. 433
 Zak, J. 819
 Zaker, M. 341–2
 Zaks, J. 804
 Zamani, R. 326
 Zarankiewicz, K. 793
 Zaslavsky, T. 237
 Zeckendorf, E. 61

Zehavi, A. 315
 Zeilberger, D. 87, 89–90, 178,
 192, 557
 Zernitz, H. 34
 Zha, X. 327
 Zhan, S. 326
 Zhan, X. 249
 Zhang, C.-Q. 312, 423
 Zhang, K. M. 316, 449
 Zhang, L. 413, 422
 Zhao, H. 65
 Zhao, Y. 414–5, 422
 Zhou, B. 248
 Zhou, H. 262

Author Index

Zhou, L. 66
 Zhu, B. W. 292
 Zhu, Q. C. 458
 Zhu, X. 356, 403, 434, 442, 461,
 742
 Zhu, Y. 352
 Zhu, Y. J. 326
 Ziegler, G. M. 37, 476, 804,
 811–3, 815
 Zielinski, P. 655
 Zito, J. 264
 Ziv, A. 764
 Znárn, Š. 296, 631
 Zykov, A. A. 354, 476

Glossary of Notation

Relations, operators, positional notation

$\{ \}$ - set

\cap, \cup, \in, Δ - intersection, union, membership, symmetric difference

$\lfloor x \rfloor, \lceil x \rceil$ - floor, ceiling (nearest integer at most or at least x)

$\overline{[k]}$ - $\{1, \dots, k\}$

k -object - “object” with parameter value k

$[a, b]$ - $\{a, \dots, b\}$, if a, b are integers

$[x, y]$ - $\{z: x \leq z \leq y\}$, if x, y are real numbers or poset elements

$[x^k]$ - coefficient of x^k in a formal power series in x

$[S, T]$ - cut consisting of all edges from S to T

$\langle v_1, \dots, v_n \rangle$ - path with vertices v_1, \dots, v_n in order

$[v_1, \dots, v_n]$ - cycle with vertices v_1, \dots, v_n in order

$n!$ - $\prod_{i=1}^n i$

$n!!$ - $\prod_{i=0}^{\lfloor (n-1)/2 \rfloor} (n - 2i)$

$n_{(r)}$ - $n(n-1) \cdots (n-r+1)$

$n^{(r)}$ - $n(n+1) \cdots (n+r-1)$

$d \mid n$ - d divides n

$d \nmid n$ - d does not divide n

$|S|$ - size of set S

$\#\{i: i \in S\}$ - size of described set

$\#(G)$ - number of components of a graph

A^T - transpose of a matrix A

\overline{S} - complement of set S (within a given universe)

\overline{G} - complement of graph G

G^*, P^*, M^* - dual (of a planar graph, poset, or matroid)

\leftrightarrow - adjacency relation on vertices of graph

\rightarrow - succession relation on nodes (vertices) of digraph

\parallel - incomparability relation on elements of poset

$<, >$ - cover relation on elements of poset

$a_n \sim b_n$ - asymptotic to (ratio approaching 1)

$\lambda \vdash n$ - λ partitioning the integer n , with $\lambda_1 \geq \dots \geq \lambda_k$ and $\sum \lambda_i = n$

$G - v$, $G - S$, $G - e$, $G - F$ - deletion of vertex, vertex set, edge, edge set
 $G \cdot e$, $M \cdot e$ - contraction of edge or matroid element
 G^- - graph formed by deleting one edge from an edge-transitive graph G
 G^+ - graph formed by adding one edge to a graph G with edge-transitive \overline{G}
 $M|F$, $M \cdot F$ - restriction or contraction of a matroid to the elements F
 $\mathbf{0}$, $\mathbf{1}$ - unique lower and upper bounds of a poset
 $\mathbf{1}_n$ - column vector of n 1s
 $\mathbf{2}$, \mathbf{n} - two-element, n -element chains in posets
 $\mathbf{2}^n$ - subset poset of order n
 $\mathbf{2}^E$ - subsets of E , ordered by inclusion
 $\binom{n}{k}$ - binomial coefficient counting k -subsets of the set $[n]$
 $\binom{n}{k_1, \dots, k_m}$ - multinomial coefficient
 $\binom{S}{k}$ - the collection of k -subsets of set S
 $G + H$ - disjoint union of graphs or posets
 mG - disjoint union of m copies of graph or poset
 $G \diamond H$ - join (disjoint union plus all edges between)
 $G[S]$ - subgraph of G induced by S
 $G[H_1, \dots, H_n]$, $G[H]$ - lexicographic product, composition (graphs or posets)
 $G \square H$ - Cartesian product of graphs
 $G \boxtimes H$ - strong product
 $G * H$ - weak product, tensor product
 $P \times Q$ - Cartesian product of sets or posets
 P^k - Cartesian product of k copies of poset P
 G^k - graph on $V(G)$ with $u \leftrightarrow v$ if $d_G(u, v) \leq k$
 P_k - k th rank of a ranked poset P
 $x \vee y$ - least upper bound in poset (join)
 $x \wedge y$ - greatest lower bound in poset (meet)
 X^- , X^+ - down-set and up-set generated by set X in poset

Usage of Roman alphabet

$A(G)$ - adjacency matrix of a graph G
 $\mathbf{A}(P)$ - incidence algebra of a poset P
 A_n - n -element antichain
 $A(n, k)$ - Eulerian number counting permutations of $[n]$ with k runs
 $A(x)$, $B(x)$ - typical generating functions with formal variable x
 AP - arithmetic progression
 box G - boxicity of a graph G
 $B(G)$ - bandwidth of a graph G , block graph of G
 B_n - Bell number counting partitions of $[n]$
 $\mathbf{B}(M)$ - bases of a matroid M
 Bin (n, p) - binomial distribution (n trials, success probability p)
 BIBD - balanced incomplete block design
 $c(G)$ - circumference of a graph G
 $c(n, k)$ - number of permutations of $[n]$ with k cycles
 $\text{ch}(G)$ - choosability (list chromatic number) of a graph G

- $\text{cr}(G)$ - crossing number of a graph G
 $\text{cr}'(G)$ - (recti)linear crossing number of a graph G
 $\text{cr}_k(G)$ - crossing number when each edge is at most k segments
 \mathbb{C} - complex numbers
 C_n - cycle of length n , n th Catalan number
 $C(P)$ - set of critical (unforced) incomparable pairs of a poset P
 $\mathbf{C}(M)$ - circuits of a matroid M
 $d(v), d_G(v)$ - degree, valence (of a vertex v in G)
 $\bar{d}(G)$ - average vertex degree in a graph G
 $d(u, v), d_G(u, v)$ - distance between u and v (in a graph G)
 d_1, \dots, d_n - degree list
 $d_k(P)$ - size of maximum k -family in a poset P
 $\hat{d}_k(P)$ - size of maximum k -cofamily in a poset P
 $d_{m,n}$ - Delannoy number counting up/right/diagonal paths from $(0, 0)$ to (m, n)
 $\text{def}(S)$ - deficiency of a vertex set S (given by $o(G - S) - |S|$)
 $\text{df}(S)$ - defect of a set S in a bipartite graph (given by $|S| - |N(S)|$)
 \det - determinant of a matrix
 $\text{diam}(G)$ - diameter of a graph G
 $\dim(P)$ - order dimension of a poset P
 $\partial_k(m)$ - numerical shadow of k -binomial expansion of an integer m
 $\partial(F)$ - shadow of a set-family F
 $D[S]$ - down-set (ideal) of poset, generated by set S , often $D[x]$
 D_n - number of derangements of $[n]$
 D_N - divisors of N , ordered by divisibility
 e - base of natural logarithm, 2.71828...
 $e(P)$ - number of linear extensions of a poset P
 $e_k(x)$ - number of linear extensions with x at height k
 $\text{ex}(n; H)$ - maximum number of edges in n -vertex graph not containing H
 E - typical set of elements of a matroid
 $E(G)$ - set of edges in a (hyper)graph G
 $\mathbb{E}(X)$ - expectation of random variable X
 EGF - exponential generating function
 f_k - rank parameters of family F in a ranked poset
 f_λ - number of Young tableaux with shape λ
 $f(T)$ - in inclusion-exclusion, #elements whose properties are indexed by T
 F_n - n th classical Fibonacci number
 \hat{F}_n - n th adjusted Fibonacci number (equal to F_{n+1})
 \mathbb{F}_q - q -element field
 F, G, H - typical graphs, digraphs, or hypergraphs
 $g(G)$ - girth
 G^p - random graph in Model A (edge-probability model)
 G^m - random graph in Model B (fixed-size model)
 $\mathbb{G}(n, p)$ - random graph model with edge-probability p
 $G(P)$ - comparability graph of a poset P
 $h(P)$ - height of a poset P
 $h(x)$ - height of poset element x , or expected height of element
 H_n - n th harmonic number, $\sum_{i=1}^n 1/i$
 $H_{k,n}$ - k -connected Harary graph with n vertices

- $i(G)$ - interval number of a graph G
 $\mathbf{I}(M)$ - independent sets of a matroid M
 $I(P)$ - set of incomparable pairs of poset P
 $\text{Int}(P)$ - family of intervals in a poset P
 $I(x)$ - set of elements incomparable to x
 I - identity matrix (diagonal matrix with 1s on diagonal),
 J - square matrix with every entry equal to 1
 $J(P)$ - lattice of order ideals of a poset P , ordered by inclusion
 K_n - complete graph of order n
 $K_{m,n}$ - complete bipartite graph with parts of sizes m and n
 $K_{S,T}$ - complete bipartite graph with parts S and T
 $K(n, k)$ - Kneser graph with vertex set $\binom{[n]}{k}$
 $l(P)$ - length of a poset P (length of longest chain)
 \lg - logarithm in base 2
 \ln - natural logarithm
 $L(G)$ - line graph of a graph G
 $L(v)$ - list of colors at a vertex in a list assignment
 $L(m, n)$ - poset of m -tuples a with $0 \leq a_1 \leq \dots \leq a_m$, componentwise ordered
 $L_n(q)$ - lattice of subspaces of finite vector space of dimension n over $GF(q)$
 m - often the number of edges in a graph
 $m_k(\mathbf{C}), m_k(a)$ - k -norm of chain partition or sequence [= $\sum_i \min\{k, a_i\}$]
 M - a matching, a matroid, etc.
 M^e - chain product $e_1 \times \dots \times e_n$
 $M(G)$ - cycle matroid of a graph G
 $\text{Mad}(G)$ - maximum average degree among subgraphs of a graph G
 $\text{MOLS}(n, k)$ - family of k pairwise (mutually) orthogonal Latin squares of order n
 M_5 - the 5-element modular non-distributive lattice
 n - typically the number of vertices or elements in a (hyper)graph or poset
 N_5 - the 5-element non-modular non-distributive lattice
 $N_k(P)$ - size of k th rank of a poset P
 $N(x), N_G(x)$ - (open) neighborhood of x in a graph G
 $N[x]$ - $N(x) \cup \{x\}$ (closed neighborhood)
 $N(S) - \cup_{x \in S} N(x)$
 $N^+(x)$ - out-neighborhood (successor set) of x in a digraph
 $N^-(x)$ - in-neighborhood (predecessor set) of x in a digraph
 $N(m)$ - maximum number of pairwise orthogonal Latin squares of order m
 \mathbb{N} - set of natural numbers
 $\mathbb{N}_0 - \mathbb{N} \cup \{0\}$
 $o(G)$ - number of odd components
 $o(f(n))$ - functions whose ratio to $f(n)$ approach 0
 $O(f(n))$ - functions bounded (for large n) by a constant multiple of $f(n)$
 O_k - Odd graph (disjointness graph on k -sets and $(k + 1)$ -sets in $[2k + 1]$)
 $\mathbf{O}(Q)$ - order polytope of a poset Q
 OGF - ordinary generating function
 OA - orthogonal array
 $p(n, \varepsilon)$ - threshold probability function
 per - permanent of a matrix
 $\mathbb{P}(A)$ - probability of event A

- P_n - path with n vertices
 $P(n, k)$ - generalized Petersen graph
 PIE - inclusion-exclusion principle
 $P(L)$ - poset of join-irreducibles of a lattice L
 PBD - pairwise balanced design
 $P(\sigma)$ - P -symbol of a permutation σ
 $Q(\sigma)$ - Q -symbol of a permutation σ
 \mathbb{Q} - rational numbers
 Q_k - hypercube of dimension k (as a graph)
 $r(M), r(P)$ - rank of a matroid or poset
 $r(x), r(X)$ - rank of an element in a poset, rank of a set in a matroid
 r_M - rank function of matroid M
 \mathbb{R} - real numbers
 $R_B(x)$ - rook polynomial of the board B
 $R(p_1, \dots, p_k; r)$ - Ramsey number for k -coloring r -sets
 $R_k(p; r)$ - Ramsey number for k -coloring r -sets with common threshold p
 $R(p, q)$ - Ramsey number for 2-coloring 2-sets
 $R(G_1, \dots, G_k)$ - graph Ramsey number
 S_n - symmetric group on n elements (set of permutations of $[n]$)
 S_g - surface with g handles
 $S(n, k), s(n, k)$ - Stirling numbers of second and first kinds
 SDR - system of distinct representatives
 $STS(v)$ - Steiner triple system of order v
 T - typical tree or tournament
 $T_{n,r}$ - Turán graph (equipartite complete r -partite n -vertex graph)
 $U[S]$ - up-set in poset generated by set S , typically $U[x]$
 $V(G)$ - set of vertices of a graph or hypergraph G
 $w(l, k)$ - van der Waerden number (guaranteeing l -term AP in k -coloring)
 $w(P)$ - width of a poset P
 $W_k(P)$ - size of k th rank of a poset (Whitney numbers)
 X - typical random variable
 X^+, X^- - positive and negative parts in a signed involution
 X, Y - typical bipartition of a graph into two independent sets
 Y - Young lattice of all partitions of integers, ordered componentwise
 \mathbb{Z} - integers

Usage of Greek alphabet

- $\alpha(G)$ - maximum size of independent set in a graph G
 $\alpha'(G)$ - maximum size of a matching in G (pairwise independent edges)
 $\beta(G)$ - minimum number of vertices covering all edges in G
 $\beta'(G)$ - minimum number of edges covering all vertices in G
 $\gamma(G)$ - genus, domination number of a graph G
 $\delta_{i,j}$ - Kronecker delta (1 if $i = j$, 0 if $i \neq j$)
 $\delta(G)$ - minimum vertex degree of a graph G
 $\Delta(G)$ - maximum vertex degree of a graph G
 Δ - a simplex

- $\Delta_k(P)$ - $d_k(P) - d_{k-1}(P)$ for a poset P
 $\hat{\Delta}_k(P)$ - $\hat{d}_k(P) - \hat{d}_{k-1}(P)$ for a poset P
 $\varepsilon(v)$ - eccentricity of a vertex v
 $\zeta, \eta, \mu, \kappa, \lambda$ - incidence functions on posets
 $\theta(G)$ - minimum number of cliques to cover all vertices in a graph G
 $\kappa(G)$ - connectivity of a graph G
 $\kappa'(G)$ - edge-connectivity of a graph G
 $\kappa(x, y)$ - local connectivity for vertices in a graph
 $\kappa'(x, y)$ - local edge-connectivity for vertices in a graph
 $\lambda(x, y)$ - maximum number of independent x, y -paths
 $\lambda'(x, y)$ - maximum number of edge-disjoint x, y -paths
 $\lambda_1, \dots, \lambda_n$ - eigenvalues (of adjacency matrix)
 Λ_n - partitions of integer n , ordered by refinement
 $\mu(n)$ - Möbius function of an integer n
 $\mu(x, y)$ - Möbius function on interval $[x, y]$
 μ_1, \dots, μ_n - Laplacian eigenvalues of a graph
 π - circumference of circle with unit diameter, 3.1415926...
 π, σ, τ - typical permutations
 Π_n - lattice of partitions of an n -set, ordered by refinement
 ρ - density
 $\sigma(X)$ - span of a set X in a matroid
 Σ - universe of sets for intersection classes, surface
 \sum - summation
 $\tau(G)$ - number of spanning trees in a graph G
 $\tau(G)$ - minimum partition into complete bipartite subgraphs
 $\Upsilon(G)$ - arboricity of a graph G
 ϕ - a mapping, often an isomorphism, coloring, or homomorphism
 $\varphi(m)$ - Euler totient function (numbers in $[m]$ relatively prime to m)
 $\chi(G)$ - chromatic number of a graph G
 $\chi'(G)$ - edge-chromatic number of G
 $\chi''(G)$ - total chromatic number of G
 $\chi_\ell(G)$ - list-chromatic number of G
 $\chi'_\ell(G)$ - list-edge-chromatic number of G
 $\omega(G)$ - clique number of a graph G
 ω_n - unbounded sequence
 $\Omega(\mathbf{A})$ - intersection graph of collection \mathbf{A}
 $\Omega(\Sigma)$ - intersection class for subsets of Σ
 $\Omega(f(n))$ - functions at least a constant multiple of $f(n)$ (for large n)

Subject Index

A page number in italics indicates a definition. A single listing in italics may indicate the definition for a concept so prevalent (such as “graph”) that it would not be productive to list its occurrences. An item that appears on few pages may have none italicized for the definition.

Page ranges in bold indicate material such as the proof of a major result or the main treatment of the concept; this may also include a definition. Pages ranges may also include isolated pages where the term does not appear.

Parenthetical clarifiers act as subheadings. Terms consisting of a word modified by prefatory notation are alphabetized according to the root word.

- absorption property *516*,
 520–2, 536, 538
 abstract dual *526–7*
 achromatic number 342
 acyclic coloring *423*
 acyclic graph *239–40*
 acyclically k -choosable *423*
 adjacency *210*
 adjacency matrix *211*, 216,
 224–5, 234–5, 256, 747,
 756, **766–82**
 adjacency relation 3–4, 218
 adjacent 4, *210*
 adjugate matrix *748*, 777
 adjusted Fibonacci numbers
 53, 59–61, 67, 104, 112,
 115, 442, 664–5, 740
 admissible transposition *208*
 advance *197*, 201–2
 affine m -cube *473*
 affine hull *744*
 affine plane 628, *649–50*, 655
 affine space 69, 802
 Ahlswede–Daykin
 Inequality *597–9*, 608, 823
 Alexandrov–Fenchel
 Inequalities 827
 algebraic connectivity *778*
 Alon–Tarsi number *742*
 Alon–Tarsi orientation *742*
 Alon–Tarsi Theorem
738–42, 746
 alphabet **17–20**, 80, 104,
118–21, 132, 336, 441,
 566, 667
 alteration method *670*, 673
 alternating cycle 413, 423,
 572–3, 583–4, 755–6, 765
 alternating path *277–8*,
 282–3, 287, 518
 alternating permutation
 177–8, 207
 angle orders *828–9*, 832
 anti-Ramsey theory *457*
 antichain **496–500**, 509, 511,
 515, 520, 524, **543–64**,
 569, 575, 581, 583–4, 589,
 593–4, 603–6, 666, 668
 antipodal 782, **806–12**, 819
 antisymmetric 8, 225, *541*,
 621–2
 arborescence *749–51*
 arboricity 412, 421, *535*, 677
 Arithmetic–Geometric Mean
 Inequality 709
 arithmetic m -grid *474*
 arithmetic progression 2, 61,
463–7, 473–4, 479, 484–6,
 568, 685
 Art Gallery Problem 394,
 419
 ascent (in permutation) 65,
101, 106, 178, *197*
 aspect (of hereditary system)
516, 520–1, 528–30
 Assignment Problem
279–82, 287–8
 associativity *179*, 545, 588,
 614, 759
 Asymmetric Local Lemma
681
 asymptotic *9–10*, **82–7**,
657–60, **693–705**, etc.
 asymptotic series *86*
 AT-orientation *742–3*, 747
 augmentation property
518–22, 525, 529, 536–9
 augmenting path **277–84**,
 287, *519*
 augmenting trail 287

- automorphism (of graph) 212–4, 216, 218–9, 250, 459, 565, 666, 693, 699
 automorphism (of poset) 565, 606
 average distance 251
 σ -avoiding permutation 431–3, 442
 Aztec diamond 34
 Azuma's Inequality 706, 712–7, 722
- backbone chromatic number 342
 balanced charging 409–11, 413, 415, 422, 424
 balanced edge cut 710–1
 balanced graph 692–3, 702, 822–4, 831
 balanced incomplete block design (BIBD) 612–8
 balanced signed graph 237
 balanced tableau 208
 δ -balanced pair 822–4, 831
 ballot list 41–5, 48–9, 56, 63, 605
 q -ballot list 42, 50, 64, 128
 ballot path 41, 45, 49, 55, 166
 Ballot Problem 39, 46, 49, 189–90
 bandwidth 703, 799–801, 818–9
 bar visibility graph 394
 barred permutation 102, 158
 X, Y -barrier 299, 395
 barycenter 251
 barycentric coordinates 783
 barycentric representation 784–5, 788–90
 base exchange graph 541
 base exchange property 516, 520–4, 537, 539, 541
 base (in ideal of sets) 501–2, 512
 base (in matroid) 515–6, 520–6, 530, 536–41
- base (in vector space) 122–3, 568
 Bell number 126, 134, 147
 Berge cycle 435
 Berge's Theorem 501, 512
 Berge–Tutte Formula 265–6, 272–4, 277
 Bernoulli number 123, 133
 Bernoulli random variables 707, 712
 Bertrand's Ballot Problem 39, 46, 49, 189
 BEST Theorem 752
 biadjacency matrix 256–7, 754–6
 biclique 770–1, 781
 X, Y -bigraph 211, 216, 227, 253–68, 278–9, 287, 332, 359, 364–5, 480, 486–7, 492, 517, 522, 566–7, 631, 672–3, 755–6, 779–80
 bigraphic 227
 bijection 2–4, 8, 15–6, 25, 36, 41–50, 63–4, 99, 170, 177, 196, 212, 442, 526–7, 538, 545, 626, 741, 764, 781
 Bijection Principle 15
 bijective proof 15, 22, 29–30, 55–6, 63, 66, 105–6, 115, 132–5, 141–3, 148, 192–3
 binary n -tuple 2, 25–6, 53, 58–9, 62, 236, 426, 507, 555, 580, 619, 699, 722, 724, 726, 729, 745, 754
 binary list 15, 21, 25, 39, 41, 93, 116, 121, 505, 513, 669
 binary matrix 2, 431–4, 510, 744
 binary maze 669
 binary relation 2, 8, 224, 542, 605
 binary search 84, 91, 447
 binary tree 43–4, 47–9, 135, 440
 Binet's Formula 68, 664
 binomial coefficient 18, 24–35, 40, 56, 59, 62, 74, 78, 86, 88–9, 92, 111, 132, 156, 166, 178, 658, 734
 binomial convolution 118–20, 123–6, 132
 binomial distribution 687, 707–10, 714, 720–1
 k -binomial expansion 494–5
 binomial inversion 124, 132
 r th binomial moment 694–6, 704
 binomial random graph model 687–8, 692
 Binomial Theorem 18, 26–7, 33, 77, 85, 119–23, 157, 161, 185, 674
 binomial type 123
 biorder 605
 bipartite graph 211, 231, 253–97, 359, 364–5, 368–9, 517–8, 529, 531, 547, 660, 667, 746–7, 754–6, 767–8
 bipartite poset 547, 575–80, 584, 790, 832
 bipartite Ramsey number 620, 624
 bipartite tournament 334
 bipartition 211, 223, 231, 280, 329, 426, 456, 770
 biplane 616
 Birkhoff diamond 405, 421
 Birkhoff–von Neumann Theorem 257, 261
 bisection 810, 820
 block (in a design) 9, 612–5, 622–6, 634, 640–1, 645–6, 649–56, 730
 block (in a graph) 136, 294–7, 314, 341–2, 348, 355, 606
 block (in a matrix) 432–3, 462, 611, 618, 763, 778
 block (in a partition) 3, 46, 49, 56, 64, 121–2, 125–7, 133–4, 145–7, 157, 175, 194, 488, 522, 567–8, 588, 605, 607, 678, 716, 761

- block design 9, 609, **612–9**, 623
 block structure 463–7
 block-cutpoint graph 295, 297
 blow-up graph 269, 330
 Blow-up Lemma 481
 blow-up poset 560
 board of forbidden positions **160–3**, 171–2, 175–6
 bond 293, 297, 380–1, 386, 395, **525–7**, 763
 bond matroid **525–7**
 bond space 752–3, 763–4
 Bondy–Chvátal Theorem 320
 Bondy’s Lemma 323–5
 Bonferroni Inequalities 695–6
 book 763
 Boolean algebra 545
 Borsuk’s Conjecture 817–8
 Borsuk–Ulam Theorem 798, **806–12**, 815, 817, 819
 Bose Construction 642–3
 bottleneck 252
 boundary 11, 379–93, 398–9, 402, 411, 415, 719–20, 755, 784, 788, 796, 800–1, **806–9**, 813, 816, 819
 boundary bound 800
 k -bounded 327–8, 334
 χ -bounded 351–2
 Bounded Differences
 Condition 714–6, 719, 722
 bounded poset 571–2, 762
 boxicity 705
 bracketing structure 555–8, 565–6
 branch vertex 327, 334, 356, 390, 392, 710
 k -branched 327
 branching 749, 751
 Breadth-First Search (BFS) 247, 252, 336
 bridge 231, 233, 765
 Brooks’ Theorem 337, 342, 347–8, 355, 371
 broom 239, 352
 Brouwer Fixed-Point Theorem **802–6**, 819
 Bruck–Chowla–Ryser Theorem 616–7, 626
 Brun’s sieve 696
 Brunn–Minkowski Theorem 825
 Bulgarian Solitaire 143
 bumping procedure **195–200**, 203, 206, 208
 Burnside’s Lemma **179–85**, 187
 cactus 295
 (k, g) -cage 219
 canonical basis 758
 canonical coloring 443, 470
 canonical cycle representation **99–100**, 104–6
 Canonical Ramsey Theorem 461, **470–2**, 474
 canonical simplex 824, 827
 cardinality 2–3
 Caro–Wei Theorem 662–3, 684
 cartesian product 2, 7, 14, 214–6, 224, 244, 292, 326, 329, 334, 344, 359, 372, 394, 541, 545, 665, 716, 771, 773, 780–1, 804, 822
 Cassini’s Identity 60–1
 Catalan numbers **41–6**, 48, 52, 55–6, 63–4, 77, 115–6, 136, 177, 206, 432, 587
 Catalan recurrence 55–6, 63–4, 77, 136
 Catalan’s Identity 61
 caterpillar 187, 654, 819
 Cauchy–Binet Formula **168**, 748–9, 763
 Cauchy–Davenport Theorem 733–4, 745
 Cayley’s Formula **36–7**, 46–7, 58, 127–8, 136, 747, 763, 777–8
 Cayley–Hamilton Theorem 768
 cell 154, 191–3, 196, 578, 784–9, **799–807**
 center 233, 239, 243, 250–1, 441, 502, 620, 771, 828–30
 central Delannoy number 28, 34, 52, 62, 64, 117
 centroid 251, 440, 474, 824–7
 chain 538, **543–71**, 574, **583–92**, 595–7, 600–8, **757–62**, 821–3, 831
 chain decomposition 546–8, **553–7**, 561–2, 565–7, 606
 chain rule 125, 130, 506–8
 character 622
 characteristic equation **67–80**, 173
 characteristic function 17, **597–600**
 characteristic polynomial **67–71**, 74, 79, 81, 761, 766, 780–1
 characteristic root **67–72**, 76, 79, 81, 84
 charge **406–16**, **421–4**
 Chebyshev’s Inequality **595–7**, 692, 703, **706–10**, 721–2
 Chernoff Bound **706–14**, 720–2
 Chernoff–Hoeffding Bound 709, 722
 Chevalley–Warning Theorem 735–6
 child 43–4, 47, 136, 177, 443
 Chinese Postman Problem 287
 Chinese Remainder Theorem 441
 choice number 346–7, 355–6, 660–1

- choosability 346–8, 362, 365,
 403, 407–8, 414, 417, 424,
 660, 739, 742, 747
 (k, d)-choosable 403–4
 f -choosable 347, 356, 363,
 365, 738
 k -choosable 346–7, **353–6**,
 363–5, 402–3, 414, 417,
 420–4, 623, 660, 667, 677,
 738–40, 746–7
 chordal graph 366–7, 370,
 374–6, 386
 chordless cycle 366–7, 374
 chord (geometric) 21, 24, 48,
 79, 82, 128, 387–8, 792
 chord (in graph) 213, 216,
 315–6, **348**, 366–7, 377,
 382, 393, 396, 401, 403,
 411, 415, 550, 698, 742–3,
 786, 796–7
 k -chromatic 335, 340–4,
 349–57, 405, 421, **434–7**,
 442, 451, 461, 478–9, 682,
 684, 709–10
 chromatic index **357–62**
 chromatic number **335–57**,
 366–70, 402, 421, 434–8,
 442–3, 451, 454, 550,
 572–3, 581, 671–2, 684–5,
 701, 709–10, 716–7,
 729–30, 738–9, 745, 769,
 812–4, 820
 chromatic polynomial 159,
 174, 374, 762
 chromatic Ramsey number
 455–7, 461
 Chvátal's Condition 320–1,
 326, 332–3, 705
 Chvátal's Conjecture 318,
 501–3, 512
 Chvátal's Theorem 320–1,
 332–3
 Chvátal–Erdős Theorem
 321–2, 327, 332, 334, 705
 circle order 828–30, 832
 circuit (in graph) **233–6**,
 239, 250, 268, 307, 389,
 419, 678, 738, 751–2
 circuit (in matroid) **514–29**,
 536–9, 657
 circulation **738–44**
 circumference 322–5, 332
 Class 1 358–9, 369–73,
 422–3
 Class 2 358–9, 372
 claw 212, 297, 330
 clique 210, 336, 357, **366–71**,
 374–6, 444, 459, 685, 700,
 726, 729
 k -clique 210, 337, 375,
 449–50, 476–8, 483,
 489–90, 504
 clique covering 368
 clique number 336, 343, **368**,
 374, 685, 687, **700**
 clique Ramsey number 455
 clique tree 374
 closed ear 305–7
 closed form 89
 closed set (geometric) 811,
 813, 817
 closed set (in matroid)
 528–9, **534–9**, 595
 closure (geometric) 807, 811
 closure (Hamiltonian)
 320–1, 325, 332–3
 closure operator 529
 cobases 523–4
 cocircuit 523–4, 537–9
 cocycle matroid 524
 coefficient operator 73, 96–7,
 110, 733
 cofactor **748–9**, 752, 777
 cograph 375, 778, 782
 coherent signing 755–6
 colex ordering 493–5
 co-lexicographic 493
 color fan **360–1**
 k -color Ramsey number 459,
 461, 601
 color-critical 344–5, 352–4,
 820
 k -colorable/ k -coloring 182,
335–46, 352–7, 369,
399–407, **414–22**, 434–9,
 443–4, 448–9, **453–69**,
 473–4, 573, 581–2, 601–3,
 638, 658–62, 666–7,
 673–5, 684–6, **801–4**,
 812–4, 820
 2-colored bipartite graph
 135
 k -colored graph 104
 coloring 158–9, 335
 H -coloring 422, 457
 L -coloring 346–7, 355–6,
 363–5, 403, 407–8, 661,
 667, 677
 coloring number 338
 column matroid 516–7, 537
 column-canonical
 permutation 208
 column-strict tableau 189,
 192–6, 203–5, 207
 Columns Condition 462–3,
 474
 Combinatorial
 Nullstellensatz **732–8**,
 741–2, 745–6, 764
 combinatorial proof 15,
 22–3, 26, 31–4, 40, 48,
 60–6, 96, 102, 109, **114–7**,
 132–4, 156, 173, 176, 208
 combinatorial reciprocity
 762
 Combinatorial Shearer's
 Lemma 508–9
 Committee-Chair Identity
 26, 40, 42
 common system of distinct
 representatives (CSDR)
302–3, 314, 532, 562
 compact set 805, 809
 Compactness Principle
 468–9
 comparability digraph
 542–3, 548, 570

- comparability graph 374–5, **542–5**, 547, 549–50, 570, 575, 582–3, 803
- comparable **541–4**, 568, 590, 762
- compatible orientation 762
- compatible vertices 315
- complement 2, 175, 210
- complement reducible graph 375
- complete d -ary tree 440, 443, 667
- complete bipartite graph 211–2, 236–7, 334, 346, 375, 547, 631, 770
- complete family (of Latin squares) 610, 623–4, 627–8
- complete r -uniform hypergraph 435, 475, 491, 601, 608, 613, 616
- completely labeled cell 799, **801–6**
- component (of graph) 4, 229
- component structure 125–7, 188
- composition (of an integer) 19–21, 23, 30, 45, 53, 60, 81, 137, 146, 173–4, 606
- composition (of functions) 3, 98, 125, 127, 130–1, 179–80, 212, 427, 809
- composition (of graphs / posets) 376, 459, 583
- Compositional Formula 127
- compound event 675
- Condensation Method 170, 178
- conditional entropy 506, 508
- conditional expectation 713
- conditional probability 7, 191, 506, 679, 713, 718
- conditional random variable 713
- conference matrix **621–2**, 624
- configuration (planar coloring) **404–8**, 421
- configuration (discharging) 411–7, 423–4
- (6, 3)-configuration 684
- configuration model 697
- conflict graph 398
- congruence class 3, 38, 103, 142, 149, 338, 427, 441, 477, 606, 613, **635–6**, 641–2, 646, 727
- $\frac{1}{2}$, $\frac{2}{3}$ -Conjecture 823
- conjugate partition 141–3, 150, 152, 192, 208
- connected graph 4–6, **124–7**, 135–6, 187–8, **229–52**
- k -connected **289–306**, 311–7, 323–6, 329–34, 347–8, 353, 386–402, 411, 415–8, 422, 425, 702, 742–3, 784
- connected set 229–30
- connection relation 4–5, 229–30
- connectivity **289–92**, 295–304, 313, 322, 326–7, 700, 721, 778
- connector 801–2
- Connector Lemma 803–4
- containment poset 553, 588–9, 606, **828–32**
- containment relation 3, 8
- containment representation 828
- contractible edge **304–5**, 313, 785–6
- contraction 304, 313, 349, 381, 390, 392, 398, **524–7**, 540, 710
- Contraction Lemma 304, 393
- contractive mapping 442
- Convergence of Moments Method 694–6
- converges (formal power series) 107, 109, 125, 140
- convex combination 256–7, 261, 512, 783–4, 797, 802, 805
- convex embedding 392–3, 397–8
- convex function 505, 620, 630–1, 663, 672, 681, 709, 713, 794
- convex n -gon 21, 43–4, 48, 56, 79, 82, 165, 387–8, 446, 458
- convex property 688
- convex region 388, 446, 816, 824–5
- convolution 26, 31, 94, 108, 110–1, 117–20, 123–6, 132, 563–4, **757–60**
- copy (as a subgraph) 212
- cost **279–82**, 394, 399, 447
- countable 2, 6–7, 469, 662
- Counting by Cases 14
- Counting by Stages 14
- counting sequence 51–2
- counting variable 662, **689–94**
- Coupon Collector 668, 704
- cover (weighted) **279–82**
- cover diagram 542–4, 549, 552, 559, 565
- cover digraph 542–3, 550
- cover graph **542–5**, 549–50
- cover relation 542, 544, 550, 605, 759
- covering set 281
- α -critical 264
- k -critical **344–6**, 349–55, 402, 415, 420
- p -critical 369–70, 375–6
- τ -critical 568
- j th critical class 464
- critical graph 361
- p -critical graph 369, 375
- critical pair 573
- cross-section 824–5
- crossing **377–81**, 393, 405, 420, 663, 698, 779, **790–8**
- crossing number **790–8**, 832

- crown 22, 185, 584
 cryptomorphism 529
 CSDR 302–3, 313, 532
 cube 182–3, 214, 219, 248,
 251–2, 260, 291, 296,
 329–30, 358, 373, 380,
 385, 388, 428, 461, 467,
 473–4, 566, 584, 668, 684,
 720, 764, 781–2, 798, 800,
 803–5, 820–2, 829
 cubic graph 210
 curve **377–81**
 cut-edge 231, **237–41**, 249,
 252, 267, **272–6**, 295, 305,
 373, 379–80, 523, 753
 cut-vertex 231–2, 240, 276,
 289, **294–5**, 297, 315, 371,
 382, 391, 421
 cutset 296, 375–6, 550
 k -cycle 135, 184, 186, 213,
 218–20, 252, 323–4, 372,
 377, 411–5, **420–3**, 457,
 460, 630, 646–7, 684–5,
 755, 780
 cycle (in graph) 4–6, 209,
 231–4, **316–48**, etc.
 cycle (in digraph) 36–7, 60,
 144–5, 152, **225–45**, 389
 cycle (in hypergraph) 435–7
 cycle (in permutation) 8,
 54–7, 62, 66, **98–100**,
 104–6, 109, 112, 122, 126,
 135, 147, 172, 175, **181–6**
 cycle index **181–7**
 Cycle Lemma 42, 49, 425
 cycle matroid **515–8**, 523–9,
 536–40
 cycle representation 99–100,
 104–6
 cycle space 752–3, 764
 cycle structure 100, 182,
 185–6
 cycle-factor 260
 Cycle-plus-triangles
 Theorem 739–40
 cyclic edge-connectivity 297
 cyclic group 185
 cyclic rotation/shift 41–2, 45,
 48, 50, 145, 178, 185, 634,
 643–4
 d’Ocagne’s Identity 60–1
 decision problems 10
 decomposable matrix 765
 decomposition (of graph)
 232–9, 249–51, 275,
 305–7, 312, 315, 318–9,
 389, 407, 411–2, 422, 534,
 639–40, **646–50**, 677–8,
 771, 781
 decomposition (of poset) 546,
 548, **553–7**, 561–2, 565–7,
 574, 606
 deconditioning 506–8
 Dedekind’s Problem 557–8,
 603
 Defect Formula **258**, 262,
 265, 531, 540
 deficiency 258, **265–7**, 275,
 567
 degeneracy 338, 347, 639,
 667
 k -degenerate graph 338,
 343, 347–8, 373, 402, 417,
 419, 421, 484, 677, 739
 degree (of vertex) 5
 degree charging **407–10**,
 414, 423
 degree list 221–2, 238–9,
 249, 269, 295, 297, 320–1,
 332, 387, 398, 663
 degree Ramsey number 455
 degree sequence 221
 degree set 227
 degree-choosable **347–8**,
 355, 415
 Degree-Density Lemma 484
 Degree-Sum Formula 220,
 223, 233, 290, 311, 380,
 385, 476–7, 527, 630
 Delannoy number **28–31**,
 33–4, 52, 57, 62, 64, 81,
 113, 117
 deletion method 670–2, 682,
 684–5, 702
 deletion operator 208
 density 371, 407, **479–87**,
 492, 693, 703, 778–9,
 800–1, 810, 819
 dependent edge 550
 dependent event 679, 685
 dependent set 514–5, 527,
 538
 Dependent Random Choice
 672–3, 684
 dependent vectors 748, 753
 derangement 46, 52, **54–5**,
 59, 62–3, 82–3, 123–4,
 134–5, 154–5, 159–62,
 174–5
 derivative (for series) 107–8,
 116, 125, 130
 descent (in permutation) 65,
 101, 148, 172, 197, 206,
 667
 descent (in poset) 602
 descent set 101, 172
 (v, k, λ) -design **612–29**, 634,
 639–41, 645–6, 649–50,
 653–6
 deterministic algorithm 10
 de Bruijn cycle 239, 763
 Diagonal Criterion 724, 728,
 731, 818
 diagonal Ramsey number
 449, 465, 504, 675, 685,
 701
 diagram (of poset) 542–4,
 549, 552, 559, 565
 diameter **243–5**, 248–52,
 275, 294, 296, 313, 386–7,
 395, 399, 428, 441, 566,
 628, 630, **689–91**, 704,
 768, 775–6, 780, 782,
 817–8
 difference family 639
 difference set 460, **634–9**,
 645
 difference triple 645
 digraph 8, **165–9**, 224–6, etc.

- dihedral group 186
 Dijkstra's Algorithm 246–7
 dilation 800
 Dilworth decomposition 546,
 548, 551, 554, 556, 566,
 574
 Dilworth's Theorem 430,
 546–8, 551–3, 564, 580,
 606–7, 823
 dimension (of poset) 545,
 568–84, 607, 783, 790,
 828–32
 dimension (of space) 9, 29,
 39, 48–9, 64, 68–9, 76, 96,
 170, 261, 388, 431, 464–7,
 474, 520, 568, 606, 633,
 711, 723–30, 744–5, 753,
 763–6, 814–8, 821–32
 k -dimension 584
 dimension argument 723–30
 d -dimensional permutation
 821, 831
 d -dimensional simplex 799,
 802–8, 822, 827
 Dirac's Condition 320, 327,
 330
 Dirac's Theorem 320, 324
 direct sum 533
 Directed Matrix Tree
 Theorem 749–50
 Dirichlet Drawer Principle
 425
 Discharging Method 407–17
 disconnecting set 293
 discrepancy 722
 discrete probability space
 6–8, 657, 662
 discrete random variable 7,
 111, 662, 695, 713, 722
 disjoint k -split 305
 disjoint union 215
 disjoint-path system
 166–70, 172
 disjointness graph/relation
 3, 213–4, 218–9, 782
 displacement 22, 176, 186,
 792
 distance (between points)
 342, 440, 490, 619–20,
 633, 639, 719–20, 724,
 729–30, 744–5, 793–4,
 805, 809, 811, 817–9, 826
 distance (in graph) 189,
 242–52, 287, 314, 325,
 336, 374, 389, 399, 422,
 428, 442–3, 583, 667–8,
 739, 782, 800–2
 k -distance set 724, 730, 744,
 817
 distance-regular 782
 distributive lattice 591–600,
 606–8
 divide-and-conquer 84, 394
 F -divisible 640
 Dixon's Identity 88
 Dobiński's Formula 134
 dodecahedron 316, 328, 385,
 416
 domain 2, 17, 99, 190, 444
 dominating set 639, 670–1,
 684, 702, 704
 Doob process 715–6, 719
 dot product 9, 614, 618–9,
 724–6, 745, 748, 817
 double jump 698
 double shift graph 581
 double-partition 150
 double-star 249, 460
 doubly stochastic matrix
 256–7, 261, 765
 down-set 501, 544–6, 557,
 564, 569, 581–2, 589,
 593–608, 759, 828
 DP-coloring 356
 drawing 4, 8, 211–3, 225,
 377–85, 398, 421, 542–4,
 663, 718, 791–8
 dual augmentation property
 539
 dual base exchange 520–1,
 538–9
 Dual Degree-Sum Formula
 380
 dual graph 379–89, 395,
 400, 406, 409, 419, 513,
 524, 799, 803
 dual hypergraph 438–9
 dual ideal 545
 dual matroid 523–7, 537–40
 Dual Möbius Inversion
 Formula 760
 dual poset 543–4, 549, 553,
 557, 560, 562, 567, 591–2,
 607, 832
 dual problem 259, 272, 276,
 279–83, 287–8, 298–9,
 366, 368
 Durfee square 143
 Dushnik's Theorem 576–7,
 584
 Dyck n -path 45, 48, 64, 151
 dynamic coloring 424, 668
 ear decomposition 305–7,
 312, 315, 389
 eccentricity 243, 250
 edge 4
 edge cover 259–60, 263
 edge cut 293–8, 306–7, 345,
 372, 380–1, 395, 710–1,
 752–3, 763, 778–9
 edge set 4
 edge-choosability 362–5,
 407–8, 413–4, 746
 edge-chromatic number
 357–62, 365, 370–3, 414,
 420, 423, 439
 k -edge-colorable/coloring
 357–65, 371–3, 400, 407,
 416–7, 420, 422, 685, 797
 edge-coloring (hypergraph)
 438–9, 602–3
 L -edge-coloring 362–5, 413
 k -edge-connected 267, 293,
 296–8, 301, 305–15, 329,
 345, 355, 372, 386, 400,
 416–7, 420, 536, 540, 797
 edge-connectivity 293–301,
 417

- edge-exposure process 715, 718
- edge-threshold weighting 376
- edge-transitive 212, 214, 218–9
- EGF 93, **118–29**, 132–6, 175
- eigenvalue 80–1, 616, 723, **765–82**
- EKR*(k, t)-family **497–9**, 511
- elimination property 517–21, 528, **536–9**
- elongation 539
- embedding 377–85, **389–94**, 397–9, 510, 571, 582, 589, 753–6, 781, 783–4, 789–90, 795–7
- Embedding Lemma 480–5
- embeds (for posets) 543–4, 571, 582–3, 589, 607, 828
- k -ended 327
- endpoints 4–5, 8, etc.
- entropy 493, **504–10**, 513, 823
- Entropy Compression Method 680
- enumerator by w 93–5, 103, 118–9
- equality subgraph 280–2
- equipartition 480, 485, 815–6
- equitable coloring 372, 420
- equivalence class 3, 4, 65, 137, 145, **179–85**, 212, 230, 234, 236, 632, 764
- equivalence relation 3, 4, 8, 145, 178–80, 212, 230, 632
- erasure 227
- Erdős Principle 20, 162
- Erdős–Faber–Lovász Conjecture 438
- Erdős–Heilbronn Conjecture 734
- Erdős–Ko–Rado Theorem **497–501**, 512, 584, 727, 781
- Erdős–Rényi model 687
- Erdős–Stone Theorem **478–82**, 491, 770
- Erdős–Szekeres Theorem 206, 344, 430–1, 550, 580, 601, 821
- establishes (incomparable pair) 569
- Euler Conjecture 612, 642, 648, **651–4**
- Euler totient 155, 172, 177, 185
- Euler’s Formula **383–8**, 397, 401–2, 409, 537, 754–6, 784
- Euler’s Identity 143, 150
- Euler’s Pentagonal Number Theorem 151
- Eulerian circuit/graph **233–6**, 239, 250, 268, 297, 307, 312, 381, 386–7, 389, 417, 419, 656, 678, 738, **751–2**
- Eulerian number **101–3**, 105–6, 111, 122, 133, 158
- Eulerian polynomial 102, 135
- Eulerian trail 234
- even cycle 209, 237, 277, 295, 346–8, 363, 413, 415, 518
- even graph 135, 178, 188, 232, 234, 237–8, 249, 295, 297, 754
- event 6–7, 16, 24, 171, 191, 506, 595, **599–601**, 608, **657–62**, 665, 668–9, **674–86**, 689, 694–7, 702, 711, 713, 716–8, 822, 824
- excedance 106
- excess matrix 280–2
- exhaustive regular covering 568
- expander 705, 779–80, 782
- Expansion Lemma 301, 313
- expectation/expected value 7–8, 104, 111, 162, 479, 505, 561, 563, 596, 657, **662–6**, **670–2**, **689–97**, 700, 706–9, **712–7**, 721, 793, 821–2
- exponential enumerator 118–9
- Exponential Formula **124–8**, 135, 172, 188
- exponential generating function 118
- exponential polynomial 134
- extended binomial coefficient 26, 31, 74
- Extended Binomial Theorem 27, 77, 85
- external vertex 402–3, 785–9
- extremal number 479
- extremality 223
- face 182–4, 187–8, **378–403**, 409–17, 421–3, 523, 742, 747, **753–6**, 784, 796, **801–4**
- j -face 401, 406, 410–5, 422–3
- face charging 409–10, 415
- facet 802–4, 807–8, 811
- factor (in graph) **268–78**, 678
- factor (in product) 18, 68–9, **95–100**, 108–13, 119–21, **137–9**, 184, 553, 591, 727–31, 734–8, 741, 755, 759, 761, 818
- 1-factor **264–76**, 314, 329–30, 358–9, 647–8, 650, 678, 754–6, 764–5
- f -factor **268–71**, 276
- k -factor 264, 268, 274, 318, 358, 371, 372–3, 400, 419, 647–8, 764
- factor-critical 275
- factorial 17–8, 24, 33, 54, 82–6, 106, 118–28, 132–6, 159–62, 190–2, 206–7
- factorial moment 694
- factorial polynomial 175
- factorization 89, 139, 152, 428, 553, 593–4, 627, 647
- 1-factorization 358–9, 371

- falling factorial 17, 22, 69,
 122–3, 170, 176, 694
- family 2
- k -family 548, 549, 551,
 553–4, 561, 565, 567
- x , U -fan 301–2, 350
- Fan Lemma 301–2, 350
- Fan's Theorem 324–5
- Fano matroid 537
- Fano plane 435, **613–6**,
 623–8, 634, 638, 641
- Fáry's Theorem 393, **398**,
 783, 796
- Fermat's Little Theorem
38–9, 48, 428, 441, 735–7
- Ferrers diagram **141–5**,
 148–52, 175, 177, 185,
 189–90, 557, 604, 819
- Ferrers relation/digraph 605
- Fibonacci numbers 52, 53–4,
 58, 60–2, 65, 67–8, 80,
 104, 112, 115, 150, 434,
 442, 664, 740
- FILL (in tableaux) 202–4
- filter 466, 545
- first-fit coloring 336
- Fisher's Inequality **614–5**,
 641, 655, 730
- Five Color Theorem **402**,
 404, 419
- fixed point 8, 54, 59, 63, 98,
 105–6, 123, 135, 144, 152,
 154–5, **159–67**, 174, 178,
 206, 250, 631, 666, 805–6
- FKG Inequality **596–600**,
 608
- flat (in matroid) 529
- flower snark 372
- Folkman's Theorem 466–7,
 474
- Ford–Fulkerson CSDR
 Theorem 302–3, 313, 530,
 532, 562
- forest 47, 128, 136, 239,
 247–51, 262, 297, 311,
 338, 351, 357, 381, 382–3,
 412, 414, 419–23, 515–9,
 524, **535**, 567, **677–8**
- formal Laurent series
 130–1, 136
- formal power series 73, 77,
93–7, 107–8, 114, 116,
 118, 125, 129–31, 136,
 140, 553, 733
- Four Color Theorem 316,
 349, 377, 399–401, 404–6,
414–23, 781, 797
- Four Function Inequality
 597
- fractional chromatic number
 812
- fragment 398–9
- H -free (graph) 223, 297,
 330, 342, 351–2, 375–6,
 489–91, 631–3
- free matroid 522
- Friendship Theorem 775–6
- frugal coloring 681
- fullerene 387
- functional digraph 8, **36–8**,
 54, 166, 185, 224
- fundamental cycle 753
- fundamental set of circuits
 537
- Füredi–Hajnal Conjecture
 432–3
- Fuss–Catalan numbers 42,
 128
- Gale's Lemma 811–3, 820
- Gale–Shapley Proposal
 Algorithm 285, 288
- Gallai coloring 474
- Gallai's Theorem 260, 263,
 355, 540
- Gallai–Edmonds Theorem
 268, 275
- Gallai–Roy Theorem 339,
 342, 344
- Gallai–Witt Theorem 467
- gambler problems 66, 116,
 714
- Gaussian polynomial 152,
 568
- GCD matrix 177
- general solution (for
 recurrence) **67–72**, 91
- generalized Catalan
 numbers 42
- generalized partition
 matroid 534
- generalized Petersen graph
 373
- generalized Young tableau
 189
- k -generated family 830
- generating function
 (ordinary) 14, **73–82**,
93–118, **137–9**, 142, 146,
 148–9, 161–2, 169, 172–3,
 178, 182–4, 431, 553, 557,
 564, 567, 704, 707, 709,
 751, 761
- generating function method
 66, **72–81**, 105, 124, 132
- generating series 93–4
- geometric distribution 111
- Geometric random variable
 668
- Ghouilà–Hourai graph 550
- girth 213, 218–20, 237, 244,
 248–52, 275, 296, 312,
 332–3, 357, 388, 403,
 409–10, 414, 417, 422–4,
434–7, 442–3, 527, 550,
 639, 671–2, 754
- Glaisher's Theorem 149
- global discharging 413
- Golden Ratio 68
- Gosper's Algorithm 89–90
- Grötzsch graph 340, 550
- Grötzsch's Theorem 414, 420
- Grünbaum–Hadwiger–
 Ramos problem 815
- graceful labeling 22, 646,
 654, 656
- Graceful Tree Conjecture
 646

- graded poset 552–4, 558–62,
 565–8, 583, 589, 594,
 606–7, 761
 Graeco–Latin square 612,
 656
 (d, r, g) -graph 443
 graph 4
 graph polynomial 740–1
 graphic list 221–2, 227, 276,
 295, 297
 graphic matroid 515, 522–7,
 536–7
 graphical design 645–6
 greedy algorithm 245, 252,
 513, **519–22**, 529, 536,
 538, 556, 566, 671,
 greedy coloring **336–43**, 345,
 357, 362, 371, 375, 677,
 701, 769
 Greene numbers 201, 203–5
 Greene’s Theorem 201–6
 Greene–Kleitman Theorem
 548–52, 589
 grid 48, 61, 79, 166, 173,
 261, 363, 394, 440, 464,
 467, 474, 511, 665, 764,
 771, 783–4, 789, 793–4,
 797, 800–5, 819
 grid graph 394
 Grinberg graph 400, 418
 Grinberg’s Theorem 401, 418
 group 98, 153, **179–90**, 193,
 212, 427, 441, 459, 606,
 623, 734

 Hadamard matrix **618–24**
 Hadwiger Conjecture 349,
 710
 Hadwiger–Nelson Problem
 729–30
 Hajós Conjecture 349,
 709–10
 Hajós construction 355
 Hales–Jewett Theorem 463,
 467, 474
 half-idempotent 643–4

 Hall’s Condition / Theorem
254–66, 273, 302, 313,
 365, 404, 551, 559–61,
 705, 779, 803
 Ham Sandwich Theorem
 815–6, 820
 Hamiltonian closure, **318–9**,
 323, 330–1
 Hamiltonian cycle **316–34**,
 400–1
 Hamiltonian decomposition
 318–9, 332
 Hamiltonian path 321, 329,
 334, 401, 418, 537, 666
 Hamiltonian-connected
 326–7, 333, 401
 Hamming distance 619,
 719–20
 Hanani–Tutte Theorem 398
 Handshaking Lemma 220
 Hankel matrix 177
 Happy End Theorem 446
 Harary graph 290–1, 313
 harmonic number 91
 Hasse diagram 542
 Hat-Check Problem 54
 Havel–Hakimi Theorem 221
 head (of coin) 7, 31, 46, 59,
 66, 86, 95, 97, 103–4, 111,
 135, 668–9, 703, 707, 722
 head (of edge) 8, 166, 224–5,
 361, 370, 389, 522, 748,
 785, 788
 head partition matroid 522
 Heaviside method 75, 138–9
 Heawood graph 219, 274,
 424, 638
 height (in lattice path) 26,
 45, 48, 151, 177, 226,
 height (in poset) 544, 551–2,
 561–2, 571, 582, 588, 608,
 762, 790, 822–7, 831
 height (in tower) 452–3, 484,
 488, 602–3, 673
 hereditary class 366–8, 394,
 415
 hereditary system **514–40**

 heterochromatic 470
 Heteyi’s Theorem 276
 Hex (game) 803–4
 Hilbert’s Cube Lemma 473
 Hiraguchi’s Inequality 575
 Hoeffding–Azuma
 Inequality 715, 722
 Hoffman–Singleton graph
 244, 252, 775
 hole (in graph) 366
 i -homogeneous 444–5, 453,
 470
 homogeneous recurrence
67–71, 79
 homogeneous set 444–5,
 461, 466, **468–70**, 658, 729
 homomorphism 457, 461
 homothetic 467
 Hook–Length Formula
189–92, 207–8, 432, 746
 Hopf–Stiefel function 745
 Hungarian Algorithm
 280–3, 286
 hypercube 214, see “cube”
 hypergeometric series 89–90
 hypergraph 9, **434–40**, 442,
 451–2, 468–9, 475, 491–3,
 496–8, 572–3, 601, 608,
 613–6, 638–41, **659–60**,
 666–7, 673–4, 684, 686,
 722, 735, 803, 820
 hyperplane 48, 523, 529,
 539, 656, 735–6, 746, 805,
812–6, 820, **824–6**

 icosahedron 351, 385, 387,
 416, 420, 797
 ideal map 593–4, 607
 ideal of sets **501–3**, 510, 512,
 514, 519, 522, 533–4, 545
 idempotence property 528,
 539
 idempotent quasigroup
 642–4, 655
 image 2
 in-neighborhood 224
 in-tree **749–52**, 785, 788

- incidence algebra **757–60**
 incidence bigraph 628, 638
 incidence function 757–62, 765
 incidence graph 253, 517, 531, **628–32**
 incidence matrix (design) 9, **614–9**, 624–5, 628, 645–6
 incidence matrix ([di]graph) 211, 216, 224, 388, 537, 748–9, 752–3, 763–4
 incidence matrix (hypergraph) 9, 438–9
 incidence matrix (relation) 3, 9
 incidence poset 790
 incidence relation 3–4, 211, 378, 614, 624–6, 629, 631
 incidence vector 3, 15, 21, 493, 545, 556, 724, **727–31**, 744–5, 752–3, 763, 773
 incident 4–5, 211
 inclusion-exclusion 122, **153–64**, 171–6, 477, 695, 757, 760–1
 incomparability graph 586
 incomparable 541, 544, **568–75**, **583–7**, 593, 603–4, 608, 758, 823, 831
 incorporation property 528, 532, 539
 increasing path/trail 431, 472, 601
 increasing tree 106
 indegree 104, 224, 370, 678, 686, 749, 765
 independence number 259, 260, 334, 336, 356, 368, 458, 663, 685, 739, 773
 independent edges 253
 independent events/variables 7, 65–6, 111, 116, 190, 512, 584, 595, **658–722**
 independent paths **298–303**, 313–5
 independent positions (in grid) 160, 257, 272
 independent set (graph) 174, 210–1, 228–9, **259–64**, 322, 327–9, 335–6, 340–4, 363–4, 368, 375–6, 419, 435, 449–51, 492, 544, 547, 662–4, 671, 678, 685, 701, 704, 717–8, 729–30, 812
 independent set (matroid) **514–40**
 Independent Bounded Differences Inequality (IBDI) **719–22**
 indexed by (in OGF/EGF) 93–8, 103–4, 113–4, 118–21, 125–6, 132, 135, 137, 142, 184, 187–8, 553
 indicator variable 662, 670–1, **689–96**, 707, 711, 718
 induced circuit property 520, 538
 Infinite Ramsey Theorem 468, 471
 information-theoretic lower bound 822, 831
 inhomogeneous term 51, **70–5**, 84, 173
 injective function 2
 injective coloring 424
 integer simplex 342, 371
 integer triangle 142, 149
 Integrality Condition 774–5
 Interlacing Theorem 769, 782
 internal vertex 5, 229, 284, 298, 301, 305, 311–2, 324, 348–9, 383, 396, 403, 411, 422, 742, **785–9**
 intersecting family **497–502**, **509–12**, 608, **727–32**, 817
 L -intersecting family **727–32**, 745, 817
 t -intersecting family 497–500, 511, 513
 intersection graph 337, 342–3, 367–8, 374, 583, 608, 705
 interval (in poset) 590, 608, 722, **757–62**
 interval (of numbers) 173, 565, 604, 608, 653, 707, 722, 804, 810, 816, 832
 interval chromatic number 491
 interval coloring 373
 interval graph 337, 366–7, 374, 586, 608, 705
 interval number 608, 705, 832
 interval order 585–7, 594, 604–5, 832
 interval representation 366, 374, 585–7, 604
 inversion (in permutation) **98**, 103–4, 109, 163, 167, 208, 432, 567
 inversion formulas 102, 124, 127–33, 136, 157, 163, 747, 757, 760–1
 Inversion Principle 111, 155
 involution 126, 133, **163–8**, 176, 178, 193–4, 206, 629
 irreducible 573, 582, 584, **592–4**, 604–7
 irredundant representation 593–4
 irreflexive 3–4, 224
 isometric subgraph 764
 isomorphism 4, 178, 212, 216–8, 225, 526, 544–5, 589, 594, 607, 699, 705
 isomorphism class 178, **183–4**, 187–9, 212, 218, 248, 250, 549, 605, 687
 $J(P)$ 589, 592, **602–3** 605, 607, 762
 Jensen's Inequality 505–8
 Jeu de Taquin 201–3, 208
 join (in posets) 588–600, 605–8

- join (of graphs) 213, 336
 join-irreducible 592–3,
 604–7
 joint random variable 505
 Jordan Curve Theorem
 378–83, 400, 402
- König's Other Theorem
 259–60, 263, 368–9, 540
 König–Egerváry Theorem
 258–9, 262–3, 273, 278,
 280, 282, 287, 302, 313,
 368–9, 530–1, 547
 Kakeya set 746
 Kempe chain 404, 406, 421
 kernel/kernel-perfect 363–4
 king (in tournament) 225,
 228, 703
 Kirkman Schoolgirls
 Problem 649
 Kirkman triple system 650
 Kleitman's Inequality **595**,
 597, 608
 Kneser Conjecture 342, 798,
 811–2
 Kneser graph 251, 342, 781,
 798, **811–2**, 820
 knight's tour 330
 Knuth-equivalent 208
 Kotzig's Theorem 371, 411
 Kruskal's Algorithm **245**,
 252
 Kruskal–Katona Theorem
 495–6, 500, 510
 Kuratowski subgraph **391–3**
 Kuratowski's Theorem
 390–3, 397–9, 526–7, 753
- Λ_n 606
 $L(m, n)$ 557, 562, 567, 589,
 605
 labeled structure 119–20,
 125, 128, 132, 188
 α -labeling 656
 Lagrange Inversion Formula
 127–31, 136
- Lagrange's Theorem 616–7
 Laplacian eigenvalues /
 matrix / spectrum 776–82
 Las Vergnas' Theorem 333
 Latin square 9, **609–12**,
 622–4, 627–8, 642–3, 648,
 651–2, 656
 lattice (poset) 529, 571,
 588–608, 757, 761–2, 766,
 832
 lattice ball 29–30, 33, 57
 lattice path 24–8, 30, 39–42,
 49, 55, 61, 64, 104, 115,
 165–8, 170, 172, 176
 lattice point 25, 57, 169, 176,
 221, 389, 426, 440, 464,
 474
 lattice polygon 389
 lattice walk 25, 49, 64, 117
 layered block structure
 464–5
 leaf 5–6, 240–2, etc.
 leaf block 295, 297, 348
 k -leaf-connected 327
 left subtree 43–4, 47, 135,
 177
 length 2, 17, 25, 41, 209, etc.
 level (in poset) 553, 556,
 561–2, 567
 lexical 472–3
 lexicographic order 192,
 195–6, 198, 201, 493, 512,
 556, 566, 789
 lexicographic product 459,
 583
 lg 87, 447, **505–9**, 580, etc.
 light edge 407–13, 416
 line (geometric) 30, 48, 52–3,
 59, 72–3, 79, 199–201,
 342–3, 388, 427, 565, 613,
 794, 798, 813, 815, 820
 line (in projective plane) 9,
 624–30, 635, 638, 649–50,
 653
 line digraph 300
 2-line form 99
- line graph 300, 314, 316,
 326, 329, 357, 362–3, 368,
 371, 608, 678
 linear arboricity 412, 677
 t -linear crossing number
 795–6
 linear extension **568–84**,
 595, 599–602, 604, 608,
 760, **822–7**, 831
 linear forest 412, 422, 677–8
 linear hypergraph 438
 linear independence 68–9,
 76, 80, 176, 516, 519, 538,
 614, **723–32**, 744, 753,
 767–8, 818
 linear matroid 516, 519, 528,
 532
 linear recurrence 51–2,
 67–9, 74, 79, 84
 linearity of expectation 7–8,
 104, 162, **662–72**, 689,
 694, 707, 713, 722, 793,
 821–2
 X, Y -link 299–300, 395
 k -linked 314
 Lipschitz condition 719
 n -ary list 2, 26, 667
 0, 1-list 2, 40, 51, 173
 1, 2-list 53–4, 59, 104, 112,
 664–5, 740
 list assignment **346–8**,
 355–6, 362–3, 403, 421,
 661, 677, 686, 742
 list chromatic number
 346–8, 362, 685, 738
 List Color Conjecture 362–3,
 373, 412
 list k -colorable 346
 list edge-chromatic number
 362–5
 S -lobe 349–50, 353, 367, 375,
 391, 399
 Local Cut Lemma 680
 local density bound 800
 Local Lemma **674–86**, 719,
 722
 local Ramsey number 473

- locally finite 590, 757
 locally linear graph 684
 log-concave **563–4**, 567–8, 827
 log-supermodular 596–600
 lollipop graph 331
 Lovász Local Lemma 674, 679
 lower extension 574, 605
 Lu's Theorem 322
 Lucas numbers 53, 61, 65
 LYM inequality / order / property **558–65**, 567–8
 Lyusternik–Shnirel'man Theorem **811–4**, 817, 820
- Mader's Theorem 311, 316
 (n, k, c) -magnifier 779–80
 Markov's Inequality 671, **689–92**, 705–9, 713, 717–8, 821
 Marriage Theorem 256, 262, 268, 359, 678
 martingale 706, **712–9**, 722
 matching **253–88**, 312–4, 329, 356–8, 364–6, 434, 442, 460, 492, 510, 517–8, 522, 529–31, 547, 559–63, 566–7, 645–9, 668, 702–5, 726, 742–3, 754–6, 765
 f -matching 287
 matching number 253
 0, 1-matrix 2–3, 160, 211, 224, **432–3**, 442, 542, 570, 604, 620, 781
 Matrix Arborescence Theorem 750
 Matrix Tree Theorem **747–52**, 762–3, 777
 matroid 9, 251, **513–40**, 595, 656, 754
 Matroid Covering/Packing 536
 Matroid Intersection **529–34**, 537, 540
 Matroid Matching 532
 Matroid Parity 532
- Matroid Partition 537
 Matroid Union **533–5**, 539–40
 max-cut problem 710
 max-flow min-cut 303
 maximal 4
 maximal antichain 544, 551
 maximal chain 544, 547, 550, 552–3, 558–61, 565, 759
 maximal element (in poset) 512, **543–6**, 551–2, 557, 571, 576–7, 582–3, 586, 588–93, 606, 790
 maximal outerplanar graph 382, 387–9
 maximal planar graph **384–7**, 400, 419
 maximally connected 289, 291
 maximum antichain 497, 544, **546–51**, 553, 558, 568, 583, 606
 maximum average degree 408–9, 414, 417, 421–4
 maximum density 693, 703
 maximum weighted matching 279–83, 287–8
 meet (in poset) **588–600**, **605–8**,
 meet-irreducible 592, 606–7
 membership function 17
 Menger's Theorem **298–303**, 313, 546, 560
 Method of Deferred Decisions 702
 Method of Moments 696
 Meyniel graph 375
 min-max relation 259, 264–5, 273, 298–9, 303, 357, 366, 368, 513, **529–33**, 538, 546–7
 minimal 4
 minimal k -connected graph 310–1, 315–6
 minimal k -edge-connected multigraph 309–10
- minimal element (in poset) **543–7**, 551, 565, 571, 576–7, 582–4, 588–93, 606, 760, 790
 minimal imperfect graph 369–70
 minimal LYM order 567
 minimal nonplanar graph 390–1
 minimal vertex separator 375
 minimal separating set 304, 322, 367, 375
 minimax spanning tree 252
 minimum polynomial (of matrix) 768, 772
 minimum weighted cover 279–82
 minor 525, 527, 539, 710
 Minty's Theorem 338–9
 Mityagin's Theorem 826–7
 mixed difference system 655
 Möbius function 759–62, 765
 Möbius Inversion Formula 163, 757, 760–1
 Möbius ladder 235
 p -modular L -intersecting family 728–30
 modular lattice 594–5, 607
 Moessner's Process 62, 105
 moment (of variable) 691, 694, 696, **704–9**
 moment curve 813, 815–6, 820
 moment generating function 704, 707, 709
 monotone 430, 458, 821
 monotone (Boolean) functions 557, 596, 599–600
 monotone list/sequence 206, **430–1**, 442, 452–3, 703, 821–2, 831
 monotone path 601–3, 608
 monotone property 691, 694, 703
 monotone tournament 458

- Moore bound 244
 Moore graph 244, 252, 775
 Moore–MacNeish Theorem 611, 648, 653–4
 multidigraph 8, 749
 multiedge 233–4, 300, 304, 308, 357–9, 364, 379, 381, 384, 516, 697, 747, 785
 multigraph 8, **233–5**, etc.
 multilinear polynomial 727
 multilinear reduction 727, 731–2
 multinomial coefficient 37–9, 48, 147, 637, 690
 Multinomial Theorem 38
 multiplier (of difference set) 634–9
 multiset 2, **19**, 27, 30, **94–7**, 104, 114, 120–1, 156, etc.
 Mutual Independence Principle 676–8, 681–2
 mutually independent 675–83, 686
 Mycielski’s Construction 340, 345, 354, 434
- Narayana number 45, 49, 64
 Nash–Williams’ Orientation Theorem 309–10
 near-triangulation 395, 402
 necklace 22, 178, 181–8, 313, 809–10, 816, 819
 negative binomial 27, 74, 108
 neighborhood 210, 254
 Neighborhood Local Lemma 681–3, 686
 net (a graph) 297
 nonadjacency relation 210
 noncrossing circuit 388, 419
 noncrossing pairing 43, 48, 63, 82
 noncrossing partition 43, 49, 64,
 noncrossing tree 128–9
 nondecreasing sequence 201, 204–5, 595
- nondeterministic 10
 nontrivial graph 232, 297, 329, 345, 349, 371
 k -norm 548–9
 norm graph 633–4
 normal bipartite poset 575–6
 normal plane map 411–2
 normalized Hadamard matrix 619–20
 normalized matching property **559–63**, 567
 NP-complete 11, 316, 336, 344, 359, 435, 532, 537, 543, 573, 700
 NP-hard 11, 699, 710, 795, 800
 nullspace 52, 388, 748, 753, 766, 773
 s , t -numbering 315
- Oberwolfach Problem 647, 656
 octahedral subdivision 806–9
 octahedron 385, 789
 odd 163, 229
 odd component **264–7**, 272–3
 odd cycle 209–12, **230–2**, 237–8, 264, 278, 335–7, 342–4, 348, 355, 370, 479, 522, 764, 768
 Odd graph 219, 782
 odd representation 745
 odd walk 230–1, 550, 768
 odd-crossing number 795
 OGF **93–6**, **110–20**, 123–4, 128–9, 136–7, **141–3**, 148–9, 161, **182–9**
 on-line Ramsey theory 457
 One-Point Removal Theorem 574–5
 one-to-one correspondence 2, 15, 206, 545, 605, 813
 open set 378, **811–4**, 820
 k -optimal partition 549
- orbit 3, 8, 54, **180**, 187, 635, 639, 645
 order (of group element) 441
 order (of graph) 4, 209
 order (of Latin square) 609
 order (of projective plane) 626
 order (of recurrence) 51
 order ideal 545
 order polynomial 762
 order polytope **824–7**
 order relation 8, **541–4**, 557, 568, 570, 577, 582, 585, 591, 600, 604, 606, 757, 789, 828
 order-preserving 469, 472, 491, 528–9, 557, 565, **596–601**, 762, 824, 827
 order-reversing **596–9**
 ordered graph 491
 ordered hypergraph 601–4, 608
 ordered partition 121, 133
 ordered Ramsey theory 457
 ordered tree 43–5, 48–50, 63–4, 136, 206
 k -gon order 828
 ordinary enumerator 118
 Ordinary Exponential Formula 188
 ordinary generating function 93
 Ore’s Defect Formula 258, 262, 265, 531, 540
 Ore’s Condition 319–20, 326–7, 330, 332, 705
 Ore’s Lemma 319, 332
 Ore’s Theorem 319–20, 323–4, 327, 332, 705
 orientation 225, 228, 237–9, 255–6, 261, **306–10**, 338–9, 344, 363–4, 374, 389, 404, 428, 542, 550, 570, 678, **738–43**, 746–9, 755–6, **762–5**, 785–7, 832
 Orientation Theorem 309–10

- oriented graph 225–6, 237, 752, 756, 765
 orthant 806–8
 orthogonal array 651–3, 656
 orthogonal chain partitions 566
 orthogonal vectors 618, 621, 744, 771, 773, 777–8, 817–8
 orthogonal Latin squares **609–12**, 622–4, 627–8, 638, 651–6
 out-neighborhood 224
 out-tree 247, 749, 752
 outcome 6–7
 outdegree 224–5, 228–9, 235, 238, 255, 261, 363–5, 370, 404, 678, 686, **738–51**
 outerplanar graph **382–3**, 387–9, 398–9, 419
 outstanding line 199–201
 overfull subgraph 359, 371
- packing (of two graphs) 248
 pair group 183–4, 186
 $[k]$ -pair-covering 624
 pair-crossing number 794–5
 pairing model 697, 704–5
 pairwise balanced design 650–3, 655
 Paley matrix 621–2
 pancyclic 326, 330
 parallel classes 628, 649–50, 654–5
 parallel elements 516–7
 parent 43, 443
 parity (applications) 231, 330, 379, 382, 400, 426, 465, 755–6, 797–9, 814
 parity (of circulation) 738–43
 parity (of closed walk) 231
 parity (of dissection) 165
 parity (of permutation) 163–4
 parity edge-coloring 373
 Parity Lemma 265–7, 276
- parity subgraph 237, 249
 parking function 50
 2-part Sperner property 565
 partial k -coloring 549
 partial partition 134
 partial tableau 201–3, 208
 partially ordered set **541–608**, 821–32
 particular solution 70–5
 k -partite graph 211, **223–4**, 226, 228, 331, 335, 355–6, 454, 456, **475–9**, 489, 491, 513, 655, 663, 770, 773, 781
 N -partite hypergraph 435–7
 partition (into chains) **546–57**, 560, 566, 574
 partition (of edge set) 232–5
 partition (of integer) **137–52**, 175–6, 185–90, 202, 207, 557, 606, 647–8, 762
 partition (of set) 3, 14, 49, 56, 64, **121–2**, 125–7, 133–4, 157, 175, 251, 343, **354–5**, 419, **443–4**, 461–5, **468–72**, **480–8**, 492, 501, 568, 649, 815, 817–8
 I, F -partition 422
 ε, k -partition 480–3, 487–8 523, **530–8**,
 partition lattice 567, 588, 590, 605, 607, 761
 partition matroid 522, **529–37**
 parts (of bi/ k -partite graph) 135, 211–2, 221, 223–4, 256, 269, 280, 295, 364, 456–7, 475–6, 491, 517, 531, 607, 655, 770
 parts (of composition) 19–20, 23, 30, 45, 53, 60, 81, 137
 parts (of integer partition) 137–52, 175–6, 186–7, 192, 206–7, 606, 647
 Pascal's Formula 25, 27, 31, 39, 56–7, 78, 98, 450
 Pascal's Triangle 24–5
- path (in digraph) 166–70, 225, 229, 339, etc.
 path (in graph) 4–6, 209–12, 232–8, 277–84, 323–34
 path (in integer lattice) 24–30, 33–4, 39–45, 48–50, 55, 59, 64, 104, 115–7, 151, 172, 199, etc.
 u, v -path 4–6, 229–31, 239–42, 246–7, **298–303**, 314–6, etc.
 X, Y -path **299–300**, 313
 path matrix 166–8
 path system 165–70
 pattern (in permutation) 206, **431–4**, 442
 pattern inventory **181–8**
 pattern Ramsey number 472–4
 paw 330, 489
 peak 45, 48, 151, 177, 452–3
 pebbling move 668
 Pell sequence 62, 81, 92
 Pentagonal Number Theorem 151
 perfect elimination ordering 366
 perfect graph **366–71**, 374–6
 Perfect Graph Theorem 368–70, 547
 perfect matching 253, 256, **260–88**, 314, 329–30, 333, 356, 358, 365, 492, 510, 560, 567, 645, 702, 705, 754–6, 765
 perfectly orderable graph 375
 permanent 510, **754–6**, 764–5
 Permanent-Determinant Method 755–6
 permutation 2, 22, 54, 57, 62–6, **98–106**, 109, 112, 123–6, 135, **158–86**, **192–200**, 205–8, 261, **431–4**, 442, **576–80**,

- 666–8, 754–5, 764, 821–2, etc.
 permutation graph 343
 permutation matrix 160, 196, 256–7, 432–3, 755
 permutation statistics 98–102
 Petersen graph 213–4, **218–20**, 226–7, 236, 238, 244, 272, 318, 326, 329–30, 335, 353, 358–9, 373, 397, 416, 490, 773, 775, 782, 797, 814, etc.
 Petersen’s 2-Factor Theorem 268, 274, 372
 Pfaffian 756, 764
 PGT 368–70, 375–6
 Pick’s Theorem 389
 PIE **155–61**, 164, 172–4
 Pigeonhole Principle 16, 302, 339, **425–34**, 440–6, 449, 451, 456, 466, 468, 504, 513, 577, 602, 651, 659, 800, 803, 825
 pigeonhole property 7, 662–3, 670–1
 planar graph 316, 351, **377–424**, 523–7, 537, 739, 742–3, 746–7, **753–6**, 781, 783–4, 789–91, 795–7
 1-planar graph 797
 Planar Separator Theorem 394–7, 399
 planarization 199–201
 plane multigraph **378–87**, 401, 411
 Poisson distribution 695–7, 704
 Poisson Paradigm 696
 polarity 629–32
 Pólya’s Theorem 184–5, 188
 Pólya’s Urn 106
 polychromatic 470
 polygonal curves 378, 385
 polynomial method 732
 Polynomial Principle 16, 18, 22, 26, 34, 100–2, 122, 761
 polynomial-time 10–1, 298, 360, 550, 606, 687
 polyunsaturated 552
 poset **541–608**, **757–62**, 765–6, 790, 820, **822–32**
 positional game 261, 474
 positive lattice walk 49, 64, 117
 positive semidefinite 134
 positively correlated **595–601**, 608
 Pouzet’s Lemma 804–5, 808
 Prüfer code 46
 Prague dimension 726
 predecessor 54, 225, 324, 605
 Prim’s Algorithm 252
 prime factors 21, 155, 172, 428, 553, 592–3, 626
 principal submatrix 134, 767
 Principle of Counting Two Ways 14
 prism 326, 334
 prism-Hamiltonian 326
 probability 6–8, 16, 20–4, 39–40, 46, 54, 65–6, 83, 86, 99, 103–6, 111, 116, 135, 171–4, **189–92**, **505–7**, 512–3, 578, 584, 595–6, **657–722**, 793, **821–4**
 probability generating function
 product (of formal power series) 94–7
 product (of graphs) 214–6, 244–5, 273, **292**, 319, 326, 329, 334, 359, 372, 376, 394, 459, 773, 780–1, 794
 product (of posets) 545, 553–5, 559, 562–8, 583, 588, 590–2, 595–6, 600–1, 607–8, 760–1
 product dimension 624, **726**
 Product Formula (Möbius functions) 760–1
 Product Principle 14–8, 94
 product representation 726
 projective plane 9, 244–5, 479, 612, 616, **624–35**, 638–9, 645, 649–50, 653
 proper coloring (graph) 158–9, 174, **335–48**, **399–424**, 581, 661, 677, 684–6, 739–40, 812–4, etc.
 proper coloring (hypergraph) 435–40, 659–60
 proper dissection 665–6
 proper edge-coloring **357–65**, 371–3, 438–40
 proper labeling 799, **802–5**
 15-puzzle 202
 Pym’s Theorem **299–300**, 395, 546
 quasigroup 642–4, 655
 query 447, 711–2
 quota 426, 444–5, 448, 451, 468
 radius 29, 243, 248, 250, 352, 794, 825, 828, 830
 Rado Selection Principle 468
 Rado’s Theorem **462–3**, 466, 473–4
 rainbow 470–4
 Ramsey family (of patterns) 472
 ρ -Ramsey number 455–7
 Ramsey number 444–5, **448–62**, **472–4**, 483–4, 504, 601–2, 620, 624, 663, 673, 675, 682–5, 703, 728
 Ramsey Theorems 468–74
 Ramsey’s Theorem **443–9**, 453, 461–4, 468–9, 474–5, 483–4, 601, 604, 658
 Ramsey–Turán problem 492
 random graph 338, **671–722**
 random variable 7–8, 50, 111, 505–6, 512–3, 561, 608, **662–72**, **687–722**, 821
 range space 711–2

- rank (in matrix) 369, 388, 614, 748, 753, 767, 781
 rank (in matroid) **514–40**, 656
 rank (in poset) **552–68**, 576, 583, 585, 588, 594–5, 603–7, 761–2
 rank generating function 552–3, 557, 564, 567, 761
 Rank–Nullity Theorem 388, 753
 rank-symmetric / unimodal 553–4, 557, 561, 564, 567
 ranking 133, 285–8, 585–6, 604, 721
 rational function 74–5, 88–9
 realizer 569–84, 820
 rectilinear crossing number 795
 recurrence relation **51–92**, 101–4, 115, 127–9, 132–6, 146–9, 161–3, 173–6, 189–91, 207–8, 399, 433, 452, 462, 747, 780
 redressé 203
 reduced adjacency matrix 256, 631
 reduced graph **480–4**, 492
 reducible configuration **404–17**, 421–3
 reduction 11, 203
 reduction (of tableau) **202–6**
 refinement (of matroid) 538
 refinement (of partition) 486–8, 588, 606, 784, 808–9
 reflection principle 40
 reflexive 3–4, 8, 180, 541–2
 region 6, 24, 48, 52–3, 59, 72–3, 79, 154, 165, 220–1, **378–401**, 418, 566, 784–9, 797, 799, 802–4, 824, 832
 regular covering **559–68**
 regular digraph 678, 686
 regular graph 9, 210
 regular polygon 22, 169, 179, 385
 regular polyhedron 188, 385
 ε -regular pair/partition 480–8, 492
 regular system (of equations) 462
 Regularity Lemma 461, **478–89**, 492, 673, 794
 relation 2–3
 removable pair 575, 583
 representable matroid 516
 residue **130–1**, 140, 622
 resolution class 649
 resolvable cycle systems 647
 resolvable design 648–50
 retreat (in permutation) 197
 reverse canonical representation 105
 reverse plane partition 189
 rhombicosidodecahedron 388
 right subtree 43–4, 47, 135, 177
 right-left sequence 197
 rigid circuit graph 366
 ring (in configurations) 404–6, 421, 520
 Ringel–Kotzig Conjecture 646
 rising antichain 511
 rising factorial 17, 23, 122–3, 147
 Robbins’ Theorem 306–7
 Robinson–Schensted Correspondence (see RSK) 195
 Rogers–Ramanujan partition 151
 rook polynomial 160–1, 163, 171–5
 root (characteristic) 67–76, 79, 81, 84, 766–7
 rooted forest 128, 136, 278, 750–1
 rooted graph 43, 136
 rooted labeled structure 128
 rooted tree 43–4, 47, 106, 128, 135, 177, 189, 206, 247, 347, 399, 443, 749–51, 785–8
 Roth’s Theorem 484–6
 row-canonical permutation 208
 RSK Correspondence **193–201**, 206
 Rubin’s Block Theorem 348
 run (in list/subset) 21, 45, 49, 59, 174, 669
 run (in permutation) **101–2**, 105–6, 135, 147, 158, 432, 442, 667
 sample point 7–8, 662, 716
 SATISFIABILITY (SAT) 11, 667
 k -saturated partition 548, 551–2
 F -saturated graph 491–2
 saturates (in matching) 253
 Schensted’s Algorithm 195
 Schensted’s Theorem 198, 201, 430, 432
 Schnyder labeling **784–90**, 797
 Schröder n -path 59
 Schröder number 64
 Schröder–Bernstein Theorem 24
 Schur’s Theorem 462
 Scott–Suppes Theorem 587
 k -scrambling **578–80**, 584
 SDR 253–4, 302, 517
 secant-and-tangent numbers 65
 Second Moment Method 692–3, 698, 700, 703, 705–6, 712
 self-complementary graph 218, 232, 370, 388, 477, 490
 self-conjugate partition 143
 self-dual poset 543–5, 549, 553, 557, 560, 567, 592
 semiantichain 565

- semimodular lattice 595, 607
 semiorder **585–7**, 594, 605, 823, 831
 separating set **289–92**, 295–304, 310, 318, 322, 367, 375, 387, 391–2, 396–7
 x, y -separating set 298, 303
 (m, α) -separation 394, 396, 399
 x, y -separator 375
 (f, α) -separator 394
 sequence 2
 k -sequence (in tableaux) 201–5
 k -set 17
 set system 493
 shade 493, 497–8, 510, 559–60
 shadow 200, **493–7**, 500, 510, 559, 562, 567
 t -shadow 493, 500
 Shannon switching game 539
 shape (of tableau) **189–96**, 202–8
 Shapiro n -paths 64
 Shearer’s Lemma 508–10, 513
 SHIFT (in tableaux) **202–5**, 208
 shift graph **581**, 602, 604
 shift operator **495–6**, 498–9, 512
 shifted tableau 192, 207
 Shortcut Lemma 308–10
 u, v -shortcut 308–10
 shuffle 206, 442
 Sicherman dice 103
 signed graph 237, 297
 signed involution **163–8**, 176, 178
 signing 297, 755–6
 signless Stirling number 122
 simple graph 234, 359, 362, 527, 697, 794
 simple hypergraph 438–9
 simple word 17–8, 120, 146
 simplicial complex 766
 simplicial elimination ordering 367, 373
 simplicial subdivision 799, **802–6**, 819
 simplicial vertex 65, 367, 374
 sink 224, 561, 787
 Six Color Conjecture 417
 size 2
 size Ramsey number 455–6
 skeleton 199–200
 skew chain order 565
 skew tableau **202–5**, 207–8
 skew-overlap graph 399
 skew-symmetric matrix 756, 764
 skipless chain **553–6**, 562, 565
 Skolem Construction 644
 Small Pot Lemma 355
 smallest-last ordering 338
 Snake Oil method **112–3**, 117, 176
 snark 372
 Snevily’s Theorem 730, 745
 f -soluble 276
 source 104, 224, 228, **548**, 561, 741
 span function 527–9, 537, 539
 spanning set 523, 525, 527, 539–40
 spanning subgraph 5, 159, 210, 239, 249, 263–4, 268, 326, 334, 370, 384, 396, 420, 516, 518, 537–8, 566, 605, 657, 744, 770, 780
 spanning tree 5, 46, 58, 65, **239–52**, 266, 297, **327–8**, 334, 342–3, 347, 374, 399, 428, 474, 515, 523–4, 535, 540, 747–53, 763, 777–8
 special subdivision 806–9
 Spectral Theorem 768, 773, 778–9
 spectrum 766, 770, 772, 776–8, 781–2
 Sperner property 553–4, **557–61**, 567–8, 606
 Sperner’s Lemma **799–809**, 819
 Sperner’s Theorem 497, 511, 564, 666, 668
 split (of necklace) 809–10
 split (of poset) 547
 split graph 376
 squashed cube embedding 781
 stable matching 284–8
 stable set 210, **368–9**, 375–6, 536, 710
 stack-sortable 43, 63
 stage of evolution 698–9
 staircase tableau 152, 208
 standard deviation 691–2, 707
 standard example 570, 573, 576, 584, 605, 828, 832
 Stanley–Wilf Conjecture 432–4
 star (graph) 212, 227, 233, 243, 248–9, 251, 262, 351–2, 368, 510, 832
 t -star (of sets) **497–503**, 511
 star k -coloring 422
 star property 501, 512
 star-cutset 375
 Star-Cutset Lemma 375–6
 Steinberg’s 3-Color Conjecture 414, 421
 Steiner system 640
 Steiner triple system (STS) **641–5**, 655
 Steinitz exchange 528–9
 Stepping-Up Lemma 452–3
 Stirling Inversion 132
 Stirling number 121–2, 132–3, 146, **174–7**, 567, 761
 Stirling permutation 134

- Stirling's Formula **85–6**,
 91–2, 139, 507, 580, 658–9,
 700, 730, 745, 818, 821
- Strehl's Identity 31
- strength (of theorem) 705
- strict chain 759, 762
- strict digraph 334
- strict order polynomial 762
- strict order relation 542
- strict Sperner property 568
- strictly compatible 762
- strong absorption property
 520–1, 536, 538
- strong component 229–30,
 236
- strong dependence property
 528
- strong digraph 229, 237,
 298, 306–7
- strong edge-coloring 373
- strong elimination property
 528, 539
- strong Hall property 567
- strong orientation 306–7
- Strong Perfect Graph
 Theorem 370
- strong Sperner property
 553–4, 559, 561, 567, 606
- strongly connected digraph
 229, 237, 298, 306, 389,
 669, 703
- strongly connected vertices
 230
- strongly perfect 376
- strongly regular 649, **773–6**,
 781–2
- subadditivity (of entropy)
 507–10
- Subcommittee Identity 26,
 110, 695
- subconstituents 782
- subcube 219, 329, 584
- subdivision (graph) 305,
 311, 349–53, 356, 390–1,
 398, 416, 527, 709–10,
 739, 753–4, 798
- subdivision (simplicial) 799,
802–9
- F -subdivision 349–51, 353,
 356, 390–3, 710
- k -subdivision 684
- subgraph 4–5
- subhypergraph 468, 601
- sublattice **589–94**, 597, 600,
 605–6
- submodularity 308–9, 520–1,
 530, 533–40, 595, 607
- subposet 543
- subspace 68–9, 76, 520, 528,
 568, 606, 725, 744, 764,
 766, 814
- Substitution Lemma 376
- substitution method 82–4,
 91
- successor 54, 225, 363–5,
 410, 605, 686, 703
- suitable set (for poset)
576–80
- sum (of posets) 545
- Sum Principle 14–5, 18
- sum-free set 669
- Summation Identity 26, 33,
 66, 122
- sunflower (set system)
 503–4, 510, 512–3, 729
- superposition principle 72
- superregular 782
- surjective function 2
- 2-switch 222, 227, 230, 297,
 371
- P -symbol/ Q -symbol
195–203, 206, 208
- symmetric chain (posets)
553–7, 561–2, 565–7, 603,
 606
- symmetric design 615–8,
 624, 626, 634, 646, 773
- symmetric difference 277,
 286, 512, 518, 540, 730,
 753, 755, 763, 817–8
- symmetric group 98, 186–9,
 606, 734
- Symmetric Local Lemma
674–81, 685–6
- Δ -system 503, 728
- system of distinct
 representatives (SDR) 253
- Szemerédi's Theorem 484
- tabular representation 99
- tail (of coin) 7, 31, 46, 66, 86,
 95, 103, 703
- tail (of distribution) 706–22
- tail (of edge) 8, 36, 166,
 224–5, 255–6, 361, 370,
 389, 522, 738, 742, 748,
 751–2, 785, 788
- tail partition matroid 522
- Tait coloring 400
- Tait's Theorem 400, 417
- Talagrand's Inequality
 720–1
- tangency graph 394
- tensor product 273
- term (hypergeometric) 89–90
- term ratio 89
- ternary list 2, 23, 121
- tetrahedron 187–8, 385, 798
- (6,3)-Theorem 492
- thread 312, 411, 422–3
- threshold edge function 691
- threshold graph 376
- threshold probability
 function 691–2
- tiling 34, 54, 66, 81, 169–70,
 427, 665
- topological ordering 569
- total coloring 373, 642, 655,
 681, 739
- Total Coloring Conjecture
 373, 655
- total dominating set 639
- total graph 739
- totally unimodular 763
- Touchard polynomial 134
- Touchard's Formula 82
- toughness 318, 327, 329–30

- tournament **225–9**, 261, 334,
 342, 374, 441, 458, 666–7,
 686, 702–3, 721
 tower function 452–3, 459,
 465–6, 484, 488, 602–4,
 673
 Tower of Hanoi 70, 80, 84
 trace 766–7, 770
 track number 608
 trail 234–5, 239, 250, 287,
 313, 315, 329, 431, 442,
 752
 transitive closure 543, 572
 transitive graph 212, 214,
 218–9, 386, 812, 819
 transitive orientation 226,
 374, 542, 550, 570
 transitive relation 3–4, 8,
 180, 230, 517, 541–3, 549,
 transitive tournament 374,
 703
 transitivity of dependence
 528, 539
 translate 512, **634–5**, 638–9,
 655
 transversal (of hypergraph)
 504, 638, 735–6
 transversal (of matrix)
 279–81, 287–8, 518–9,
 523, 532–3, 537, 541, 623,
 638, 657, 735–6
 transversal (of Latin square)
 623, 638, 657, 735–6
 transversal design 656
 transversal matroid 517–8,
 522, 531–2, 536, 540
 Traveling Salesman
 Problem (TSP) 316
 tree 5–6, **35–8**, **239–52**, etc.
 k -tree 65, 375
 triangle 142, 212, etc.
 Triangle-Counting Lemma
 485
 triangle-free **223–4**, 227,
 238, 296, 305, 313, 316,
 326, 334, **339–43**, 351–4,
 375, 384, 414, 417, 420,
 434, 451, 479, 485,
 489–90, 663, 682, 685,
 744, 769, 782, 791, 812
 Triangle-Removal Lemma
 485–6, 492
 triangular chord 550
 Triangular Criterion 725–7,
 730
 triangular grid 173, 801
 triangular matrix 758, 760
 triangular number 144, 151
 triangulated graph 366
 triangulation 43–4, 48, 56,
 384, 387–8, 395–6,
402–12, 416–23, **784–9**,
 799, 809
 tripartite 460, 667
 triple system 613, **640–5**,
 649–50
 truncation (of matroid) 540
 Tucker’s Combinatorial
 Lemma **806–9**, 812–3, 819
 n -tuple 2
 Turán graph 223, 228,
475–8, 489–90, 770
 Turán number 479, 672
 Turán problem 478, 493,
 496, 498, 630
 Turán’s Theorem 223–4,
 228, 475–6, 478, 480, 483,
 489–91, 663, 769–70, 781
 Tutte graph 401
 Tutte set 265–7, 272–5
 Tutte’s Condition 265–7, 269
 Tutte’s 1-Factor Theorem
264–75, 314, 756
 Tutte’s f -Factor Theorem
270–1, 276
 Tutte’s 3-Edge-Coloring
 Conjecture 416
 Two Squares Theorem 428,
 627
 Two-Point Removal
 Conjecture 575
 two-step method 670
 ultrafilter 466
 unavoidable set 404–7, 413,
 416, 423
 underlying graph 225, 234,
 238–9, 443, 540
 unforced pair 573, 576, 584,
 606, 620
 Uniform Angle Lemma
 787–8
 uniform distribution 99, 505
 uniform family/hypergraph
 9, 435–7, 442, 452, 475,
489–500, 503–4, 510, 568,
 601, 608, 613, 616, 640–1,
659–62, 666–7, 673–4,
 684, 686, **727–32**, 787
 uniform list assignment
 355–6, 667, 686, 742
 uniformly at random 7, 91,
 507, 509, 561, 665, 668–9,
 677–8, 681, 685–7, 697,
 704, 707, 721–2, 821
 uniform matroid 522, 533,
 537
 uniform random graph
 model 688, 691–2, 698
 uniformity property 520–1,
 524–5, 536
 union (of graphs) 4
 Union Bound **658–60**, 671,
 674, 685, 711, 721
 union-closed family 503, 512
 Union-Closed Sets
 Conjecture 503, 512
 union-free family 551
 unipathic graph 228
 unit-distance graph 342,
 729, 745
 universal search list 669
 universal subset list 566
 unlabeled graph 212
 unstable pair 284
 up-down permutation 65
 up-down sequence 197, 203,
 207
 up-set **544–6**, 595, 608
 upper extension 574

- Vajda's Identity 61
 valley 45, 177–8, 453
 van der Waerden Conjecture 765
 van der Waerden number 465, 685
 van der Waerden's Theorem **463–7**, 474, 484, 685
 Vandermonde Convolution 26, 31, 110
 Vandermonde determinant 69, 207, 746, 820
 Vandermonde matrix 80
 Vandermonde's Theorem 26, 33, 92
 0, 1-variable 507, 662, 666, 708
 variance 104, 691–2, 706–7, 721
 varieties (in designs) 613, 625
 vector matroid 516, 520, 537–8
 Venn diagram 154, 530, 578, 591
 vertex 4
 vertex charging **409–12**, 416, 422–3
 vertex cover 258–60, 263, 273, **276–82**, 287, 298, 366, 368, 492, 531, 547, 568, 770
 vertex cut 289, 296, 318, 349, 353, 391
 vertex deletion 221
 vertex multiplication 376
 vertex set 4
 vertex k -split 291, 301, 305
 n -vertex graph 13
 vertex-color-critical 352–3, 820
 vertex-exposure process 715–6
 vertex-transitive 212, 214, 218–9, 386, 812, 820
 Vizing's Adjacency Lemma 362, 414, 423, 699
 Vizing's Planar Graph Conjecture 422
 Vizing's Theorem **359–61**, 365, 370–2, 425, 438–9, 744
 Wagner's Theorem 391, 398, 527
 walk (in graphs) 230–1
 2-walk 326
 u, v -walk 230–1, 235, 338–9, 767, 772, 776, 780
 Wallis product 86, 91
 Warren's Theorem 830, 832
 weak absorption property 520–1, 536
 weak barycentric representation 789
 weak chain 759, 762
 weak dual 382–3
 weak ear decomposition 306–7
 weak elimination property **517–21**, 536, 538–9
 weak exceedance 106
 weak order 567, 585
 weakly χ -bounded 351–2
 weakly chordal 375
 weakly compatible pair 762
 weight (in binary lists) 260, 494, 619
 weight (in enumerator) 93, 162, 184–5, 188
 weight (in graphs) 234, 237, 245–8, 251–2, 273, 279–83, 286–8, 374, 376, 399, 458, 477, 510, 519–22, 536, 538, 560–1
 weight (in path systems) 165–9, 176–7
 weight (of light subgraphs) **407–13**, 417, 421–4
 Weighted Neighborhood Local Lemma 686
 Weights Problem 24
 Well-Ordering Principle 469–70
 wheel 305
 Whitney number 761
 width 544, 546, 549, 552–3, 573–4, 607, 823
 Wilson's Theorem 441, 640–1
 with high probability (whp) **687–705**, 710, 717–8, 721, 821
 word 16–8, 28, 37–42, 48, 56, 80, **118–22**, 132, 145–6, 505, 511, 513, 566, 619–20, 667
 k -word 16–8
 word form (permutation) 2, 18, **98–102**, 105–6, 158, 160, 163–4, 168, 174, 197, 201, 205, 208, 236, 431, 510, 746
 Worpitzky's Identity 101–5
 WZ method 87–90, 92
 WZ pair 88
 XYZ Inequality 595, **599–601**, 608
 Young diagram 141
 Young lattice 606
 Young tableau **189–98**, 206–8, 430
 Zarankiewicz's Problem 631–3, 639
 zero-sum Ramsey number 461
 zeta-polynomial 762