

# References

- [AGP] W.R. Alford, A. Granville and C. Pomerance *There are infinitely many Carmichael numbers*, Ann. Math., **140** (1994), 703–722.
- [AGP2] W.R. Alford, A. Granville and C. Pomerance *On the difficulty of finding reliable witnesses* (with Red Alford and Carl Pomerance), in ‘Algorithmic Number Theory’ Proceedings (ANTS-I) (L. M. Adleman and M.-D. Huang, eds.), Lecture Notes in Computer Sci. **877** (1995), 1–16.
- [BHa] R. C. Baker and G. Harman, *Shifted primes without large prime factors*, Acta Arith., **83** (1998), 331–361.
- [BS] R. Balasubramanian and K. Soundararajan, *On a conjecture of R. L. Graham*, Acta Arith., **75** (1996), 1–38.
- [BC] R. P. Bambah and S. Chowla, *On numbers which can be expressed as a sum of two squares*, Proc. Nat. Inst. Sci. India, **13** (1947) 101–103.
- [BH1] C. Bays and R. H. Hudson, *The segmented sieve of Eratosthenes and primes in arithmetic progressions to  $10^{12}$* , Nordisk Tidskr. Inform. (BIT), **17** (1977), 121–127.
- [BH2] C. Bays and R. H. Hudson, *Details of the first region of integers  $x$  with  $\pi_{3,2}(x) < \pi_{3,1}(x)$* , Math. Comp., **32** (1978), 571–576.
- [BH3] C. Bays and R. H. Hudson, *A new bound for the smallest  $x$  with  $\pi(x) > li(x)$* , Math. Comp., posted on May 4, 1999, PII:S 0025-5718(99)0110407 (to appear in print).
- [Bu1] D.A. Burgess, *The distribution of quadratic residues and non-residues*, Mathematika, **4** (1957), 106–112.
- [Bu2] D.A. Burgess, *Mean values of character sums*, Mathematika, **33** (1986), 1–5.
- [C1] R. D. Carmichael, *On Euler’s  $\phi$ -function*, Bull. Amer. Math. Soc., **13** (1907), 241–243.
- [C2] R. D. Carmichael, *Note on Euler’s  $\phi$ -function*, Bull. Amer. Math. Soc., **28** (1922), 109–110.
- [Cheb] P. L. Chebyshev, *Lettre de M. le Professeur Tchébychev à M. Fuss sur un nouveau théorème relatif aux nombres premiers contenus dans les formes  $4n \pm 1$  et  $4n \pm 3$* , Bull. de la Classe phys. de l’Acad. Imp. de Sciences, St. Petersburg, **11** (1853), 208.
- [Ch1] J. Chen, *On the representation of a large even integer as the sum of a prime and the product of at most two primes*, Kexue Tongbao, **17** (1966), 385–386.
- [Ch2] J. Chen, *On the representation of a large even integer as the sum of a prime and the product of at most two primes*, Sci. Sinica, **16** (1973), 157–176.
- [Cheng] Y. Cheng, *An explicit upper bound for the Riemann zeta-function near the line  $\sigma = 1$* , Rocky Mountain J. Math., **29** (1999), 115–140.
- [CDF] J.B. Conrey, W. Duke and D.W. Farmer, *The distribution of the eigenvalues of Hecke operators*, Acta Arith., **78** (1997), 405–409.
- [CC1] J. Cilleruelo and A. Córdoba, *Trigonometric polynomials and lattice points*, Proc. Amer. Math. Soc., **115** (1992), 899–905.
- [CC2] J. Cilleruelo and A. Córdoba, *Lattice points on ellipses*, Duke Math. J., **76** (1994), 741–750.

- [De] P. Deligne, *Applications de la formule des traces aux sommes trigonométriques* In: Cohomologie Etale (SGA 4 $\frac{1}{2}$ ), Lecture Notes in Math **569** (1977).
- [D] L. E. Dickson, *A new extension of Dirichlet's theorem on prime numbers*, Messenger of Math., **33** (1904), 155–161.
- [El] P.D.T.A. Elliott, *Extrapolating the mean-values of multiplicative functions*, Indag. Math. **51** (1989), 409–420.
- [Er1] P. Erdős, *On the normal number of prime factors of  $p - 1$  and some related problems concerning Euler's  $\phi$ -function*, Quart. J. Math. Oxford, (1935), 205–213.
- [Er2] P. Erdős, *On pseudoprimes and Carmichael numbers*, Publ. Math. Debrecen **4** (1956), 201–206.
- [Er3] P. Erdős, *Some remarks on Euler's  $\phi$ -function*, Acta Arith., **4** (1958), 10–19.
- [EG] P. Erdős and R.L. Graham, *Old and new problems and results in combinatorial number theory*, Enseign. Math. Geneva (1980).
- [EKR] P. Erdős, C. Ko, R. Rado, *Intersection theorems for systems of finite sets*, Quart. J. Math. Oxford Ser. 2, **12** (1961), 313–318.
- [Fi1] M. Filaseta, *An elementary approach to short intervals results for  $k$ -free numbers*, J. Number Theory, **30** (1988), 208–225.
- [Fi2] M. Filaseta, *Short interval results for squarefree numbers*, J. Number Theory, **35** (1990), 128–149.
- [Fi3] M. Filaseta, *On the distribution of gaps between squarefree numbers*, Mathematika, **40** (1993), 88–101.
- [FT1] M. Filaseta and O. Trifonov, *On gaps between squarefree numbers*, Analytic Number Theory, Proceedings of a Conference in Honor of Paul T. Bateman (Progress in Mathematics Series, Vol. 85), edited by Berndt, Diamond, Halberstam, and Hildebrand, Birkhäuser, Boston, 1990, 235–253.
- [FT2] M. Filaseta and O. Trifonov, *On gaps between squarefree numbers II*, J. London Math. Soc. (2), **45** (1992), 215–221.
- [FT3] M. Filaseta and O. Trifonov, *The distribution of squarefull numbers in short intervals*, Acta Arith., **67** (1994), 323–333.
- [FT4] M. Filaseta and O. Trifonov, *The distribution of fractional parts with applications to gap results in Number Theory*, Proc. London Math. Soc., **73** (1996), 241–278.
- [F1] K. Ford, *The distribution of totients*, The Ramanujan J., **2** (1998), 67–151.
- [F2] K. Ford, *The distribution of totients*, Electron. Res. Announc. Amer. Math. Soc., **4** (1998), 27–34.
- [F3] K. Ford, *The number of solutions of  $\phi(x) = m$* , Annals of Math., **150** (1999), 283–311.
- [F4] K. Ford, *Maximal configurations of intersecting arithmetic progressions*, pre-print.
- [FH] K. Ford and R. H. Hudson, *Sign changes in  $\pi_{q,a}(x) - \pi_{q,b}(x)$* , submitted.
- [FK] K. Ford and S. Konyagin, *On two conjectures of Sierpiński concerning the arithmetic functions  $\sigma$  and  $\phi$* , Number Theory in Progress, W. d Gruyter, 1999, 795–803.
- [G] R. L. Graham, *Problem 5749*, Amer. Math. Monthly, **77** (1970), 775.
- [GK] S. W. Graham and G. Kolesnik, *On the difference between consecutive squarefree integers*, Acta Arith., **49** (1988), 435–447.
- [Gr] A. Granville, *ABC means we can count squarefrees*, Int. Math. Res. Not. **19** (1998), 991–1009.

- [GH] A. Granville and Harold M. Stark, *ABC implies no “Siegel zeros” for L-functions of characters with negative discriminant*, to appear in *Invent. Math.*, 13 pgs.
- [GS1] A. Granville and K. Soundararajan, *Large Character Sums* (submitted), 34 pgs.
- [GS2] A. Granville and K. Soundararajan, *Distribution of values of  $L(1, \chi)$*  (submitted), 33 pgs.
- [GS3] A. Granville and K. Soundararajan, *Motivating the multiplicative spectrum*, in *Topics in Number Theory* (S.D. Ahlgren et.al eds.), Kluwer, Netherlands (1999), 1–15.
- [GS4] A. Granville and K. Soundararajan, *The spectrum of multiplicative functions* (submitted), 56 pgs.
- [GS5] A. Granville and K. Soundararajan, *Decay of mean-values of multiplicative functions* (submitted), 29 pgs.
- [GS6] A. Granville and K. Soundararajan, *Paley in all directions*.
- [GS7] A. Granville and K. Soundararajan, *Upper bounds on  $L(1, \chi)$* .
- [GM] R. Gupta and M. Ram Murty, *A remark on Artin’s conjecture*, *Invent. Math.*, **78** (1984), 127–130.
- [Ha] G. Halász, *On the distribution of additive and mean-values of multiplicative functions*, *Stud. Sci. Math. Hung.* **6** (1971), 211–233.
- [HR] H. Halberstam and H.-E. Richert, *Sieve Methods*, Academic Press, London, 1974.
- [Hl] R.R. Hall, *A sharp inequality of Halász type for the mean value of a multiplicative arithmetic function*, *Mathematika* **42** (1995), 144–157.
- [HB1] D. R. Heath-Brown, *Artin’s conjecture for primitive roots*, *Quart. J. Math. Oxford* (2), **37** (1986), 27–38.
- [He] D. R. Heath-Brown, *Square-full numbers in short intervals*, *Math. Proc. Camb. Phil. Soc.*, **110,1** (1991), 1–3.
- [HKS] R. Howard, G. Károlyi, L. Székely, *Towards a Katona-type proof for the 2-intersecting Erdős-Ko-Rado theorem*, preprint.
- [H1] R. H. Hudson, *A formula for the exact number of primes below a given limit in any arithmetic progression*, *Bull. Austral. Math. Soc.*, **16** (1977), 67–73.
- [H2] R. H. Hudson, *A common combinatorial principle underlies Riemann’s formula, the Chebyshev phenomenon, and other subtle effects in comparative prime number theory, I*, *J. Reine Angew. Math.*, **313** (1980), 133–150.
- [Hu1] M. N. Huxley, *The integer points close to a curve*, *Mathematika*, **36** (1989), 198–215.
- [Hu2] M. N. Huxley, *Moments of differences between squarefree numbers*, *Sieve Methods, Exponential Sums, and their Applications in Number Theory*, LMS Lecture Note Series, Vol. 36, edited by Greaves, Harman, and Huxley, Cambridge Univ. Press, 1997, 187–204.
- [Hu3] M. N. Huxley, *The integer points close to a curve III*, preprint.
- [HS] M. N. Huxley and P. Sargos, *Points entiers au voisinage d’une courbe plane de classe  $\mathbb{C}^n$* , *Acta Arith.*, **69** (1995), 359–366.
- [HT] M. N. Huxley and O. Trifonov, *The square-full numbers in an interval*, *Proc. Cam. Philos. Soc.*, **119** (1996), 201–208.
- [Iv] A. Ivić, *On the number of finite non-isomorphic abelian groups in short interval*, *Math. Nachr.*, **101** (1981), 257–271.
- [Ji1] C.-H. Jia, *The distribution of squarefull numbers*, Chinese, *Acta Scientiarum Naturalium*, Univ. Pekinensis, **3** (1987), 21–27.

- [Ji2] C.-H. Jia, *On squarefull integers in short intervals*, Chinese, Acta Math. Sinica, **5** (1987), 614–621.
- [K1] J. Kaczorowski, *A contribution to the Shanks-Rényi race problem*, Quart. J. Math., Oxford Ser. (2), **449** (1993), 451–458.
- [K2] J. Kaczorowski, *On the Shanks-Rényi race mod 5*, J. Number Theory, **50** (1995), 106–118.
- [K3] J. Kaczorowski, *On the Shanks-Rényi race problem*, Acta Arith., **74** (1996), 31–46.
- [Ka] N.M. Katz, *Sommes exponentielles*, Astérisque **79** (1980), 209 pgs.
- [KT1] S. Knapowski and P. Turán, *Comparative prime number theory I*, Acta Math. Sci. Hungar., **13** (1962), 299–314; *II*, **13** (1962), 315–342; *III*, **13** (1962), 343–364; *IV*, **14** (1963), 31–42; *V*, **14** (1963), 43–63; *VI*, **14** (1963), 65–78; *VII*, **14** (1963), 241–250; *VIII*, **14** (1963), 251–268.
- [KT2] S. Knapowski and P. Turán, *Further developments in the comparative prime-number theory I*, Acta Arith., **9** (1964), 23–40; *II*, **10** (1964), 293–313; *III*, **11** (1965), 115–127; *IV*, **11** (1965), 147–161; *V*, **11** (1965), 193–202; *VI*, **12** (1966), 85–96.
- [Ko] S. Konyagin, *Estimates of the least prime factor of a binomial coefficient*, preprint.
- [Kr] E. Krätzel, *Die Werteverteilung der Anzahl der nicht-isomorphen Abelschen Gruppen endlicher Ordnung in kurzen Intervallen*, Math. Nachr., **98** (1980), 135–144.
- [Ku] A. Kumchev, *The  $k$ -free divisor problem*, Monatsh. Math., to appear.
- [LMO] J. Lagarias, V. Miller, and A. Odlyzko, *Computing  $\pi(x)$ : the Meissel-Lehmer method*, Math. Comp., **44** (1985), 537–560.
- [Leh] R. S. Lehman, *On the difference  $\pi(x) - li(x)$* , Acta Arith., **11** (1966), 397–410.
- [Le] D.H. Lehmer, *Incomplete Gauss sums*, Mathematika **23** (1976), 125–135.
- [HLi] H. Li, *On the number of finite non-isomorphic abelian groups in short intervals*, Math. Proc. Cambridge Philos. Soc., **117** (1995), 1–5.
- [Li1] J. E. Littlewood, *Sur la distribution des nombres premiers*, Comptes. Rendus., **158** (1914), 1869–1872.
- [Li2] J.E. Littlewood, *On the class number of the corpus  $P(\sqrt{-k})$* , Proc. London Math. Soc., **27** (1928), 358–372.
- [Lu] W. Luo, *Values of symmetric square  $L$ -functions at 1*, J. Reine Angew. Math., **506** (1999), 215–235.
- [Liu1] H. Liu, *On square-full numbers in short intervals*, Chinese, Acta Math. Sinica, **6** (1990), 148–164.
- [Liu2] H. Liu, *The number of squarefull numbers in an interval*, Acta Arith., **64** (1993), 129–149.
- [Liu3] H. Liu, *The number of cube-full numbers in an interval*, Acta Arith., **67** (1994), 1–12.
- [MP] H. Maier and C. Pomerance, *On the number of distinct values of Euler's  $\phi$ -function*, Acta Arith., **49** (1988), 263–275.
- [M] K. S. McCurley, *Explicit Estimates for the error term in the Prime Number Theorem for Arithmetic Progressions*, Math. Comp., **42** (1984), 265–285.
- [Me] H. Menzer, *On the distribution of powerful numbers*, Abh. Math. Sem. Univ. Hamburg, **67** (1997), 221–237.
- [MV1] H.L. Montgomery and R.C. Vaughan, *Exponential sums with multiplicative coefficients*, Invent. Math. **43** (1977), 69–82.

- [MV2] H.L. Montgomery and R.C. Vaughan, *Mean values of character sums*, Can. J. Math. **31** (1979), 476–487.
- [Pa] R.E.A.C. Paley, *A theorem on characters*, J. London Math. Soc. **7** (1932), 28–32.
- [NT] M. Nair and G. Tenenbaum, *Short sums of certain arithmetic functions*, Acta Math., **180** (1998), 119–144.
- [RR] O. Ramaré and R. Rumely, *Primes in arithmetic progressions*, Math. Comp., **65** (1996), 397–425.
- [Ra] R. A. Rankin, *Van der Corput’s method and the theory of exponent pairs*, Quart. J. Math. Oxford Ser. (2), **6** (1955), 147–153.
- [Ri] H. E. Richert, *On the difference between consecutive squarefree numbers*, J. London Math. Soc. (2), **29** (1954), 16–20.
- [Ro] K. F. Roth, *On the gaps between squarefree numbers*, J. London Math. Soc. (2), **26** (1951), 263–268.
- [RS] M. Rubinstein and P. Sarnak, *Chebyshev’s Bias*, J. Exper. Math., **3** (1994), 173–197.
- [Ru] R. Rumely, *Numerical Computations concerning the ERH*, Math. Comp., **61** (1993), 415–440.
- [S1] A. Schinzel, *Sur l’équation  $\phi(x) = m$* , Elem. Math., **11** (1956), 75–78.
- [S2] A. Schinzel, *Remarks of the paper “Sur certaines hypothèses concernant les nombres premiers”*, Acta Arith., **7** (1961/62), 1–8.
- [SS] A. Schinzel and W. Sierpiński, *Sur certaines hypothèses concernant les nombres premiers*, Acta Arith., **4** (1958), 185–208.
- [Sc1] P. G. Schmidt, *Abschätzungen bei unsymmetrischen Gitterpunktproblemen*, Dissertation zur Erlangung des Doktorgrades der Mathematisch–Naturwissenschaftlichen Fakultät der Georg–August–Universität zu Göttingen, 1964.
- [Sc2] P. G. Schmidt, *Zur Anzahl quadratvoller Zahlen in kurzen Intervallen und ein verwandtes Gitterpunktproblem*, Acta Arith., **50** (1988), 195–201.
- [Sc3] P. G. Schmidt, *Über die Anzahl quadratvoller Zahlen in kurzen Intervallen*, Acta Arith., **46** (1986), 159–164.
- [Sc] L. Schoenfeld, *Sharper bounds for the Chebyshev functions  $\theta(x)$  and  $\psi(x)$* , Math. Comp., **30** (1976), 337–360.
- [Se] J.-P. Serre, *Répartition asymptotique des valeurs propres de l’opérateur de Hecke  $T_p$* , J. Amer. Math. Soc. **10** (1997), 75–102.
- [Sh] D. Shanks, *Quadratic residues and the distribution of primes*, Math. Comp., **13** (1959) 272–284.
- [Sh1] P. Shiu, *On the number of square-full integers between successive squares*, Mathematika, **27** (1980), 171–178.
- [Sh2] P. Shiu, *On squarefull integers in a short interval*, Glasgow Math. J., **25** (1984), 127–134.
- [Sh3] P. Shiu, *The distribution of cube-full numbers*, preprint.
- [Sk1] S. Skewes, *On the difference  $\pi(x) - li(x)$* , J. London Math. Soc., **8** (1933), 277–283.
- [Sk2] S. Skewes, *On the difference  $\pi(x) - li(x)$* , Proc. London Math. Soc. (3), **5** (1955), 48–70.
- [St] P.J. Stephens, *Optimizing the size of  $L(1, \chi)$* , Proc. London Math. Soc. **24** (1972), 1–14.
- [Su] M. V. Subbarao, *On some arithmetic convolutions*, The theory of arithmetic functions (Proc. Conf., Western Michigan Univ., Kalamazoo, Mich., 1971, Lecture Notes in Math.,

Vol. 251, Springer, Berlin, 1972, 247–271.

- [Sw] H. P. F. Swinnerton-Dyer, *The number of lattice points on a convex curve*, J. Number Theory, **6** (1974), 128–135.
- [Sz] M. Szegedy, *The solution of Graham's greatest common divisor problem*, Combinatorica, **6** (1986), 67–71.
- [tR] H. J. J. te Riele, *On the sign difference  $\pi(x) - li(x)$* , Math. Comp., **48** (1987), 323–328.
- [Tr1] O. Trifonov, *On the squarefree problem*, C. R. Acad. Bulgare Sci., **41** (1988), 37–40.
- [Tr2] O. Trifonov, *On the squarefree problem II*, Mathematica Balcanika, **3** (1989), 284–295.
- [Tr3] O. Trifonov, *On the gaps between consecutive  $k$ -free numbers*, Mathematica Balcanika, **4** (1990), 50–60.
- [Tr4] O. Trifonov, *On gaps between  $k$ -free numbers*, J. Number Theory, **55** (1995), 46–59.
- [Tr5] O. Trifonov, *Integer points close to a smooth curve*, Serdica Math. J., **24** (1998), 319–338.
- [Wi] E. Wirsing, *Das asymptotische Verhalten von Summen über multiplikative Funktionen II*, Acta Math. Acad. Sci. Hung. **18** (1967), 411–467.
- [Wu] J. Wu, *Problème de diviseurs exponentiels et entiers exponentiellement sans facteur carré*, J. Théor. Nombres Bordeaux, **7** (1995), 133–141.
- [Z] A. Zaharescu, *On a conjecture of Graham*, J. Number Theory, **27** (1987), 33–40.