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ANNOUNCEMENTS

Distinguished awards of the Hardy-Ramanujan Society have been awarded to the following mathematicians for their work mentioned below.

THEOREM (G. DUFNER). *A positive even number is said to be a Goldbach number if it can be expressed as a sum of two odd primes. Let $E(x)$ denote the number of even numbers not exceeding x which are not Goldbach numbers. Then for all constants $c > 27$ we have (on GRH)*

$$E(x + (log\ x)^c) - E(x) = o((log\ x)^c).$$

REFERENCE. GUNTER DUFNER, *Binäres Goldbach problem in kurzen intervallen*-I, Periodica Math. Hungarica, vol. 29 (3) (1994), 213-243, -II ibid 30 (1) (1995), 37-60.

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THEOREM. (JIA CHAOHUA), *With the same notation as above we have*

$$E(x + x^a) - E(x) = O(x^a (log\ x)^{-B})$$

where a is any constant $> \frac{7}{78}$ and $B(> 0)$ is any arbitrary constant. Also if g_n is the nth Goldbach number, then

$$g_{n+1} - g_n = O(g_n^b)$$

for every constant $b > \frac{23}{546}$.

REFERENCE. JIA CHAOHUA, *Goldbach numbers in short intervals*-I, Science in China (series A), 29 (3) (1994), 213-243, - II ibid, 38 (5) (1995), 513-523. (*Scientia Sinica* is another name for this journal).

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REMARK. By a result due to K. RAMACHANDRA, A. SANKARANARAYANAN and K. SRINIVAS, the constant $\frac{23}{546}$ is superseded by $\frac{535}{20000}$. (This paper which uses the theorems stated below, will appear in Acta Arithmetica. In fact they prove that the number of Goldbach numbers in the interval $(x, x+x^b)$ is $\gg x^b$. This paper contains other results also).

THEOREM (R.C. BAKER and G. HARMAN). *For all constants* $\theta_1 > \frac{535}{1000}$, *we have*

$$\pi(x+y) - \pi(x) \gg Y(\log Y)^{-1},$$

where $Y = x^{\theta_1}$.

REFERENCE. R.C. BAKER and G. HARMAN, *The difference between consecutive primes*, Proc. London Math. Soc., 3 (71) (1995), (to appear).

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THEOREM (N. WATT). *For all constants $\theta_2 > \frac{1}{14}$ the inequality*

$$\pi(y+h) - \pi(y) \gg h(\log h)^{-1}$$

where $h = Y^{\theta_2}$ holds for all integers y in $[Y, 2Y]$ with the possible exception of $o(Y)$ integers.

REFERENCE. NIGEL WATT, *Short intervals almost all containing primes*, Acta Arith., 72 (2) (1995), 131-167.

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THEOREM (K.C. WONG) *For all constants $\theta_2 > \frac{1}{18}$ the inequality*

$$\pi(y+h) - \pi(Y) \gg h(\log h)^{-1}$$

where $h = Y^{\theta_2}$ holds for all integers y in $[Y, 2Y]$ with the possible exception of $o(Y)$ integers.

REFERENCE. K.C. WONG, *Primes in almost all intervals* (to appear).

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The following theorem (which improves on that of K.C. WONG) has been recently accepted for publication in Acta Arithmatica (information from PROFESSOR JERZY URBANOWICZ, to whom we are thankful).

THEOREM (JIA CHAOUHUA) *For all constants* $\theta_2 > \frac{1}{20}$ *the inequality*

$$\pi(y+h) - \pi(y) \gg h(log\ h)^{-1}$$

where $h = Y^{\theta_2}$ *holds for all integers* y *in* $[Y, 2Y]$ *with the possible exception of* $o(y)$ *integers.*

REFERENCE. *Almost all short intervals containing prime numbers,* Acta Arith., (to appear).

THEOREM (Y. MOTOHASHI). *It is known (due to* N.I. ZAVOROTNYI) *that there exists a polynomial* $P_4(x)$ *of degree* 4 *for which*

$$\int_0^T |\zeta(\frac{1}{2} + it)|^4\, dt = TP_4(log\ T) + E_2(T)$$

where $E_2(T) = O(T^{\frac{2}{3}+\epsilon})$. *For this polynomial we have* $E_2(T) = \Omega_\pm(T^{\frac{1}{2}})$.

REFERENCE. Y. MOTOHASHI, The Riemann zeta-function and the non-Eulidean Laplacian, Sugaku Expositions, vol. 8 (1) (1995), 59-87 (see addendum on page 81).

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G. DUFNER receives US $ 40 as before (to purchase a book by G.H. HARDY or his students as an award). Due to some unavoidable difficulties it was decided after that to give as an award the following book.

'Lectures on the mean-value and omega-theorems for the Riemann zeta-function' (by K. RAMACHANDRA), Lecture notes number 85 of TIFR (published by Springer-Verlag for TIFR in 1995).

for all the awardees hereafter. However the sentiments of the Society in admiring the work of the candidates will be the same as before.

A REFERENCE. The reference to the theorem of K. SOUNDARARAJAN (stated on page 46, vol. 18 (1995) of the Hardy-Ramanujan Journal) is as follows. (This work has also won the DeMorgan award of AMS as the best undergraduate thesis).

K. SOUNDARARAJAN, *Mean-values of the Riemann zeta-function*, Mathematika, vol. 42 (1) (1995), 158-174.

NEWS. Let $P(n) = P(\lambda, n)$ denote the maximum prime factor of $(n+1)(n+2)\cdots(n+[n^\lambda])$. Then improving on the previous results of K. RAMACHANDRA; M. JUTILA; A. BALOG; A. BALOG, G. HARMAN and J. PINTZ; D.R. HEATH-BROWN has proved that for all constants λ, μ with $\lambda > \frac{1}{2}$ and $\mu < \frac{11}{12}$, we have $P(n) \gg_{\lambda,\mu} n^\mu$.

REFERENCE. D.R. HEATH-BROWN, *The largest prime factors of the integers in an interval* (to appear).