ACTA ARITHMETICA
LXXIII.4 (1995)

Corrections to "A quantitative version of Runge's theorem on diophantine equations"

(Acta Arith. 62 (1992), 157–172)

by

P. G. Walsh (Ottawa, Ont.)

Let $F(x,y) \in \mathbb{Z}[x,y]$ be a polynomial of degree m in x, n in y, and whose coefficients do not exceed h in absolute value. Runge's theorem asserts that if F satisfies certain conditions, which are outlined in [3], then the diophantine equation

$$F(x,y) = 0 \tag{1}$$

has only finitely many integer solutions in x and y, and furthermore that there is a computable number $C = C(m,n,h)$ such that all integer solutions (x,y) of (1) satisfy $\max(|x|,|y|) < C$.

In [3] it was shown more precisely that under the hypotheses of Runge's theorem, all integer solutions (x,y) of (1) satisfy

$$|x| \le B(h,n)^{2mn^3(n+1)}(2h(m+1)(n+1))^{12mn^4},$$
$$|y| \le B(h,n)^{2m^2n^2(n+1)}(2h(m+1)(n+1))^{12m^2n^3},$$

where

$$B(h,n) = 4.8(8e^{-3}n^{4+2.74\log n}e^{1.22n}h^2)^n \tag{2}$$

for $n,h \ge 1$.

The quantity in (2) comes from the main result of [1], which is a quantitative version of Eisenstein's theorem on the growth of the denominators of the coefficients of a power series representing an algebraic function. In [2] it was shown that the quantity in (2) appearing in [1] is incorrect, and that a correct value, which incorporates a dependency on $m = \deg_x F$, is

$$B(h,m,n) = 4.8(8e^{-3}n^{4+2.74\log n}e^{1.22n}h^2(1+m)^2)^n.$$

Thus, the quantitative version of Runge's theorem in [3] becomes valid once the value $B(h,n)$ is replaced by $B(h,m,n)$.

References

[1] B. M. Dwork and A. J. van der Poorten, *The Eisenstein constant*, Duke Math. J. 65 (1992), 23–43.
[2] —, —, *Corrections to "The Eisenstein constant"*, ibid. 76 (1994), 669–672.
[3] P. G. Walsh, *A quantitative version of Runge's theorem on diophantine equations*, Acta Arith. 62 (1992), 157–172.

DEPARTMENT OF MATHEMATICS
UNIVERSITY OF OTTAWA
585 KING EDWARD
OTTAWA, ONTARIO, CANADA
K1N-6N5
E-mail: GWALSH@CASTOR.MATHSTAT.UOTTAWA.CA
GWALSH@MANITOU.CSE.DND.CA

Received on 16.5.1995 (2792)