A THEOREM ON SUMS OF POWERS WITH APPLICATIONS TO THE ADDITIVE THEORY OF NUMBERS (III).

BY S. CHOWLA,
Andhra University, Waltair.

Received May 20, 1935.

1. LET G(k) denote the least value of s such that every large number is a sum of at most s kth powers of positive integers. Vinogradow[1] has recently announced the results :

(1) $G(k) < 32\,(k \log k)^2 \qquad [k > k_0]$.

More recently Vinogradow[2] claims to have proved [for $k > k_0$]

(2) $G(k) \leqslant 2\,\{k(k-2) \log 2 + 2k\}$.

i.e.,

(3) $G(k) \leqslant 2k^2 \log 2 + o(k^2)$

From (3) it would follow immediately that

(4) $v(k) \leqslant 2\,(\log 2)\,k^2 + o(k^2)$

In II it was proved that

(5) $v(k) \leqslant k^2 + 7\,k - 2$

is true for infinitely many k, and this result cannot be deduced from (4), since $2 \log 2 > 1$.

2. From (5) it can be deduced that

THEOREM. *There are infinitely many odd* k *such that for any given* ϵ, *every positive integer is a sum of at most* $\{(2+\epsilon)k^2\}$ k*th powers of integers* (*positive or negative*).

This is also a consequence of Vinogradow's (2).

3. IMPORTANT CORRECTION. In my preceding paper the last line at the bottom of page 704 is incorrect. *For* "is true for $\theta \leqslant k+m$ but not true for $\theta = (k+m+1)$" *read* "is true for $\theta \leqslant t(k+m)$ but not true for $\theta = t(k+m+1)$". The argument that follows remains unaltered.

NOTE.—The theorem (proved in I and II) that

$$N(k) \leqslant \frac{k^2+k}{2} + 1$$

has also been proved independently by E. Maitland Wright.

---

[1] *C. R. Acad. Sci. U.R.S.S.* (1934). "A new solution of Waring's problem."

[2] *C. R.* (*Paris*), 1934. "sur quelques résultats nouveaux · · · "

The numbers I and II in the sequel refer to the earlier papers of this title in *Proc. Ind. Acad. Sc.* (A), 1935, **1**, 698-700 and 701-706.