

## LETTERS TO THE EDITOR

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## On Waring's Problem

LET  $G(k)$  denote the least integer  $s$  such that the Diophantine equation

$$N = x_1^k + \dots + x_s^k$$

is solvable for all sufficiently large positive integer  $N$ , where  $n, x_1, \dots, x_s$  denote positive integers.

The upper limits for  $G(5)$  have been given by various writers ranging from Hardy and Littlewood to L. K. Hera. The best result known hitherto is  $G(5) \leq 28$ , due to Hera. The author of this note has been able to improve this to

Theorem  $G(5) \leq 25$ .

The author has been able to arrive at this result by improving, among other things, a theorem of Davenport on 'admissible exponents', viz., lemma 1. Suppose that  $\lambda_1, \dots, \lambda_s$  are admissible exponents and that  $1 - \frac{1}{k} < \lambda_i < 1$ . Then  $1, \lambda_1, \dots, \lambda_s$  are admissible exponents, provided that there exists an integer  $l$  satisfying

$$1 \leq l \leq k_{2-},$$

$$k\lambda_1 - (k-1) \leq \frac{1}{2}l$$

$(2^l - 1)[k\lambda_1 - (k-1)] + \sigma \leq l+1$  ( $\sigma = \lambda_1 + \dots + \lambda_s$ ).

This theorem is not powerful enough for

$k > 3$  since it does not lead to an admissible

set  $1, x_1, \dots, \lambda_s$  such that  $1 + \sigma > k - 1 + \frac{1}{2^{k-2}}$

But this can be improved by the

lemma 2. Suppose that  $1, \lambda_1, \dots, \lambda_s$  are admissible exponents.

Then  $1, \theta, \lambda_1\theta, \dots, \lambda_s\theta$  are admissible exponents

where  $\theta = 1 - \frac{1}{k}$ .

Other consequences of lemma 2 are

$$G(6) \leq 40 \text{ and } G(7) \leq 56.$$

These are also improvements on the previous results.

K. SAMBASIVA RAO.

Department of Mathematics,

Andhra University, Waltair,

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## Drift of the Hysteresis Loop in Sorption

THAT "Hysteresis in Sorption" is real<sup>1,2,3,4,8</sup> and is perfectly reproducible<sup>10</sup> a large number of times in some cases and that the concept of cavities<sup>6</sup> having narrow necks, is a general cause<sup>10</sup> of the hysteresis effect, have already been established. For the non-existence or the disappearance of the hysteresis loop, however,