LETTERS TO THE EDITOR

On Waring's Problem

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

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

is solvable for all sufficiently large positive integer N, where n, x_1, ... 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 $G(5) \leqslant 28$, due to Hera. The author of this note has been able to improve this to

Theorem $G(5) \leqslant 25$.

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 $\lambda_1, \ldots \lambda_s$ are admissible exponents and that $1 - \frac{1}{k} < \lambda, < 1$. Then $1, \lambda_1, \ldots \lambda_s$ are admissible exponents, provided that there exists an integer l satisfying

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

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

$$(2^l - 1)[k\lambda_1 - (k-1)] + \sigma \leqslant l + 1 \; (\sigma = \lambda_1 + \cdots + \lambda_s).$$

This theorem is not powerful enough for $k > 3$ since it does not lead to an admissible set $1, x_1, \ldots \lambda_s$ such that $1 + \sigma > k - 1 + \frac{1}{2^{k-2}}$ But this can be improved by the

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

Then $1, \theta, \lambda_1\theta, \ldots \lambda_s\theta$ are admissible exponents where $\theta = 1 - \frac{1}{k}$.

Other consequences of lemma 2 are

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

These are also improvements on the previous results.

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Drift of the Hysteresis Loop in Sorption

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