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ON $\tau(n)$ MODULO 49

A CAREFUL study of my "Table of Values of $\tau(n)$" for values of n up to 400, has led me to the

Conjecture: If p be a prime of the form $7q + r$, where $r = 3, 5$ or 6

then

$$\tau(p)/7 \equiv r - 1 - [3/r] - 2q \pmod 7,$$

where $\tau(n)$ is Ramanujan's function and $[x]$ denotes as usual the greatest integer in x. It may be noted that

Lehmer's Conjecture: If p_1 and p_2 be primes congruent modulo 49 and $\left(\frac{p_1}{7}\right) = -1$,

then $\tau(p_1^{\alpha}) \equiv \tau(p_2^{\alpha}) \pmod{49}$, $\alpha \geqslant 1$,

would follow readily from my conjecture and the well-known result

$$\tau(p^m) = \tau(p)\,\tau(p^{m-1}) - p^{11}\,\tau(p^{m-2}),\ m \geqslant 2.$$

Government College, HANSRAJ GUPTA.
Hoshiarpur,
January 5, 1949.

Gupta, H., "Table of Values of $\tau(n)$," *Proc. Nat. Inst. Sci., India*, 1947, **13**, 201-6. Lehmer's Conjecture was conveyed to me by R. P. Bambah in a recent letter.

HARMONIC ANALYSIS AND EXPERIMENTAL DATA

THE chief characteristics of yields of most of the perennial and tree crops in successive years are the presence of cyclic changes and trends, great variability in the yields of plants in the same year and the correlation between the yields of the plants in successive years. Such trends, cyclic changes, variability and correlation in the data are common in experimental data of some other branches of studies such as economics, biology, etc.

The characteristics mentioned above offer some difficulties in the study and interpretations of experimental data and in obtaining conclusive results from experiments. Inconsistent results are at times obtained by applying the usual methods of the analysis of variance for the data of individual years or experiments. Orthogonal polynomials have been frequently used to represent trends in the experimental data. But they are unlikely to be of much use in representing the nature of trends mentioned earlier.

One of the methods, which appears to be satisfactory, would be to represent the data by a multiple regression equation of the