UNPUBLISHED MATHEMATICAL TABLES

188[D,F].—D. H. Lehmer, *Roots of Unity and Cyclotomic Periods.* Tabulated from punched cards and deposited in the UMT File.

In UMT **145** [*MTAC*, v. 6, p. 102] we gave values of the cyclotomic cosines $2\cos 2\pi k/p$ for $k = 1(1)p - 1$, for all primes $p < 97$ to 20D. We now have a companion table of the cyclotomic sines for the same values of k and p to 12D, and therefore a table of the exponential $\exp(2\pi ik/p)$ for these values of k and p or in other words of the primitive p-th roots of unity for p a prime <100 to 12D.

If we write $p = ef + 1$, then the roots of unity may be summed in e "periods" of f roots each according as the index of k with respect to a primitive root g [these primitive roots were chosen as in Jacobi[1]] is congruent to $0, 1, 2, \cdots, e - 1 \pmod e$. These periods η_s $(s = 0, 1, \cdots, e - 1)$ are roots of period equations of degree e with integer coefficients, whose coefficients, discriminant and sum of whose powers are of interest in the theory of numbers. The present table tabulates η_s for $s = 0(1)e - 1$, $e = 5(1)16, 18(2)26, 32$ for all primes of the form $p = ef + 1 < 100$.

D. H. L.

[1] C. G. J. Jacobi, *Canon Arithmeticus.* Berlin, 1839.

189[F].—A. Ferrier, *Étude de* $5n^2 - 1$ *et* $5n^4 - 1$. 35 typewritten pages on deposit in UMT File.

This study is in two parts. The first part gives the solutions n of the congruences

$$5n^2 \equiv 1 \pmod P \qquad P = 10\chi \pm 1 < 11{,}370$$

and

$$5n^4 \equiv 1 \pmod P \qquad P = 10\chi \pm 1 < 10{,}000$$

The second gives the factorizations of $5n^2 - 1$ and $5n^4 - 1$ for $n < 5000$ and $n < 1000$ respectively. All primes q above 10^7 which appear have been checked by showing that q divides $2^q - 2$. This was done on the EDSAC with the cooperation of J. C. P. Miller.

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190[F].—A. Gloden, *Factorization of* $N^8 + 1$ *for isolated values of N between* 500 *and* 4000. Three typewritten pages on deposit in the UMT File.

This table is an extension of a table of Cunningham[1] for $N < 200$ and a table by the author for $N \leq 500$ [*MTAC*, v. 7, p. 34, UMT **153**]. In the present table 53 complete factorizations of $N^8 + 1$ which are all new with the exception of $N = 512$ and $N = 1024$.

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[1] A. J. C. Cunningham, *Binomial Factorisations*, v. 1. London 1923, p. 140–141.