$$E = \text{total energy},$$

$$2\pi h = \text{Planck's constant},$$

$$a = \text{radius of the well}.$$

Using this table, the first few roots have been obtained graphically and are recorded in Table 1 to three significant digits. For most practical purposes, these values should be satisfactory. If necessary, they can be improved by use of Newton's method.

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1. M. ONOE, *Tables of Modified Quotients of Bessel Functions of the First Kind for Real and Imaginary Arguments*, Columbia University Press, New York, 1958.

A Note on Factors of $n^4 + 1$

By A. Gloden

The factorizations enumerated in this note form a sequel to my published factor table [1] of integers $n^4 + 1$. They have been obtained by means of my table of solutions of the congruence $x^4 + 1 \equiv 0 \pmod{p}$ for primes lying between $8 \cdot 10^5$ and 10^6 [2].

The following numbers are primes:

$n^4 + 1$ for n = 912, 914, 928, 930, 936, 952, 962, 966, 986, 992, 996.

$\frac{1}{2}(n^4 + 1)$ for n = 1071, 1087, 1101, 1119, 1123, 1125, 1135, 1163, 1173, 1183.

$\frac{1}{17}(n^4 + 1)$ for n = 1562, 1726, 1732, 1834.

$\frac{1}{41}(n^4 + 1)$ for n = 1818, 1848, 1982, 2006, 2012, 2064, 2088, 2094, 2228, 2340, 2364.

$\frac{1}{73}(n^4 + 1)$ for n = 2346.

$\frac{1}{89}(n^4 + 1)$ for n = 2262, 2302, 2544, 2682.

$\frac{1}{113}(n^4 + 1)$ for n = 2468.

$\frac{1}{137}(n^4 + 1)$ for n = 2476.

$\frac{1}{233}(n^4 + 1)$ for n = 2808.

$\frac{1}{2 \cdot 17}(n^4 + 1)$ for n = 1709, 1715, 1759, 1787, 1827, 1845, 1855, 1879, 1895, 1963, 2015, 2021, 2031, 2093, 2185, 2229, 2259, 2287, 2303, 2327, 2331.

$\frac{1}{2 \cdot 41}(n^4 + 1)$ for n = 2211, 2299, 2651, 2761, 2791, 2815.

$\frac{1}{2 \cdot 73}(n^4 + 1)$ for n = 2533, 2577, 2691, 2723, 2857.

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$\frac{1}{2\cdot 89}(n^4 + 1)$ for $n = 2747, 2771, 2885.$

$\frac{1}{2\cdot 97}(n^4 + 1)$ for $n = 2669, 2683, 2749.$

New factorizations are as follows:

$$
\begin{aligned}
938^4 + 1 &= 809273\cdot 956569\\
1060^4 + 1 &= 847577\cdot 1489513\\
1348^4 + 1 &= 940169\cdot 3511993\\
1512^4 + 1 &= 926617\cdot 5640361\\
1874^4 + 1 &= 914561\cdot 13485457\\
2100^4 + 1 &= 17\cdot 873553\cdot 1309601\\
2838^4 + 1 &= 868841\cdot 74663657\\
2908^4 + 1 &= 41\cdot 940369\cdot 1854793\\
\tfrac{1}{2}(1155^4 + 1) &= 830233\cdot 1071761\\
\tfrac{1}{2}(1191^4 + 1) &= 935353\cdot 1075577\\
\tfrac{1}{2}(1509^4 + 1) &= 872369\cdot 2971849\\
\tfrac{1}{2}(2635^4 + 1) &= 857569\cdot 28107577\\
\tfrac{1}{2}(2765^4 + 1) &= 908353\cdot 32173321\\
\tfrac{1}{2}(2977^4 + 1) &= 17\cdot 809041\cdot 2855393
\end{aligned}
$$

The following factorization was omitted from my original table [1]:

$$\tfrac{1}{2}(2055^4 + 1) = 17\cdot 572233\cdot 916633.$$

The least integers still incompletely factored correspond to $n = 1038$ and 1229, for even and odd values of n, respectively.

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1. A. GLODEN, "Table de factorisation des nombres $n^4 + 1$ dans l'intervalle $1000 < n < 3000$," Institut Grand-Ducal de Luxembourg, *Archives*, Tome XVI, Luxembourg, 1946, p. 71–88.

2. A. GLODEN, *Table des Solutions de la Congruence* $x^4 + 1 \equiv 0 \pmod p$ *pour* $800{,}000 < p < 1{,}000{,}000$, published by the author, rue Jean Jaurès, 11, Luxembourg, 1959.

A Note on the Solution of Quartic Equations

By Herbert E. Salzer

For any quartic equation with real coefficients,

$$X^4 + AX^3 + BX^2 + CX + D = 0, \tag{1}$$

the following condensation of the customary algebraic solution is recommended as quickest and easiest for the computer to follow (no mental effort required). It works in every exceptional case.

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