

and was obtained by inverse interpolation. The real part of the zero is then given by

$$x = \arccos (-y/\sinh y).$$

Zeros of  $z + \sin z$  where  $z = x + iy$

$n$	$\pm x$	$\pm y$
1	4.2123922	2.2507286
2	10.7125374	3.1031487
3	17.0733649	3.5510873
4	23.3983552	3.8588090.

If one considers the roots of  $\sin z = z$  as functions of  $n$  and interpolates for the roots corresponding to  $n = 4\frac{1}{2}, 5\frac{1}{2}, \dots, 9\frac{1}{2}$ , one obtains the zeros of  $z + \sin z$  for  $n = 5, 6, \dots, 10$ . Using the first ten roots of  $\sin z = z$  as given in an earlier article by HILLMAN & SALZER,<sup>1</sup> the above mentioned roots of  $z + \sin z$  can be obtained to at least four decimal places.

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<sup>1</sup>A. P. HILLMAN & H. E. SALZER, "Roots of  $\sin z = z$ ," *Phil. Mag.*, s. 7, v. 34, 1943, p. 575. See *MTAC*, v. 1, p. 141.

EDITORIAL NOTE.—In *Ingenieur-Archiv*, v. 11, 1940, p. 129, J. FADLE gave the first five zeros of  $\sin z \pm z$ , to 5D. Comparing with the seven-place values listed above, it appears that six last-figure endings of Fadle should be increased by unity, namely in the real parts of the second and fourth zeros, and in the imaginary parts of the first four zeros. Comparing Fadle's zeros of  $\sin z - z$  to 5D with those found by Hillman & Salzer<sup>1</sup> to 6D, we find that all of Fadle's end-figures in the first three zeros, as well as the end-figure in the real part of the fourth zero, should be increased by unity.

### QUERIES

16. TABLES OF  $\sin nx/\sin x$ .—Has any table been calculated for the function  $\sin nx/\sin x$ , for large integral values of  $n$ , say up to 100, and for values of  $x$  in radians?

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EDITORIAL NOTE: In NYMTP, *Tables of Sines and Cosines for Radian Arguments*, 1940, are values of  $\sin x$ ,  $x = [0(1)100; 8D]$ .

### QUERIES—REPLIES

19. CUBE ROOTS (Q 11, v. 1, p. 372; QR 15, v. 1, p. 432). The answer to Q 11 seems to be a definite 'No.' The table required is equivalent to one giving 5 or 6D for  $N = 1000(0.1)2000$ , and a table at 10 times this interval is already interpolable linearly, so that a printed table at interval 0.1, although it might be very convenient, cannot be considered an urgent need. For a table at interval 1, the 1930 and 1941 editions of *Barlow's Tables* seem most convenient.

Use of linear interpolation when the second difference is about 2 units means, of course, that the last figure is subject to a maximum error of about  $1\frac{1}{2}$  units, whereas tabular values are usually kept within half a unit.