A Bibliography of Publications on Floating-Point Arithmetic

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Introduction

This is a bibliography of material on floating-point arithmetic that I came up with while doing research on a floating-point package of my own. I don’t claim it to be anywhere near complete. The material listed is only what I myself possess.

My main interest was in software based, binary floating-point arithmetic on a microprocessor, so you won’t find much material about the hardware used in floating-point arithmetic (e.g. adders, carry propagation schemes, higher radix
representation for multiplication and division, etc.) in this list. There is also not too much on non-binary floating-point arithmetic.

For most fields covered in this bibliography, the important or historically relevant articles should be included. There is also some material on integer arithmetic in this list as some of the methods used with integer arithmetic contain interesting ideas that may be useful in the realization of a floating-point arithmetic package.

Also, depending on the type of microprocessor used, one may need to implement integer multiplication and division for use in the floating-point package, so articles about this topic are included as well.

As I am German, there is a bit of material in German in this bibliography. However, English translations are provided for all non-English titles.

Thanks to the people who have helped me with previous versions of this document by sending me papers or additional references:

- Steven Sommars (sesv@research.bell-labs.com),
- Jim Kiernan (jmk@teak.cray.com),
- Warren Ferguson (ferguson@seas.smu.edu),
- Nhuan Doduc (ndoduc@framentec.fr),
- K. C. Ng (kwok.ng@eng.sun.com),
- Nelson H. F. Beebe (beebe@math.utah.edu).

Bibliography entries in the Books section are ordered alphabetically by author; ordering is by ascending year in the remaining sections.

**Warning:** it has yet not been possible to bring this citation list up-to-date with the entries in the Bibliography.

### Books, hardware oriented

[1721, 281, 1286, 1216, 3111, 3315, 1916, 841, 1164, 1000, 1457, 843, 1343, 7254, 7255, 1557]

### Books, software oriented or theory

[1273, 466, 469, 470, 119, 1420, 2393, 908, 1049, 352, 2952, 2434, 2969, 2270, 320, 527, 7108]

### Books, machine specific

[2175, 3217, 3113, 2436, 1767, 1903, 2289, 1935, 2471]
1 CHOICE OF BASE, FLOATING POINT FORMATS

Journal Publications, Conference Papers, Technical Reports, Ph.D. Dissertations, Book Contributions, etc.

1 Choice of base, floating point formats

1.1 Precision and Rounding

1.2 Determination of parameters of floating point arithmetic

1.3 IEEE standards for floating point arithmetic

1.4 Floating point arithmetic, general and implementation issues

1.5 Floating point packages

1.6 Floating point units
1.7 Test of floating point routines

2 Addition and Subtraction
[375, 1513]

2.1 Floating-point Summation
[325, 345, 362, 361, 570, 639, 677, 831, 1661, 2275, 2352]

2.2 Multiplication
[680, 1246, 1260, 1476, 1543, 1516, 1574, 1601, 1593, 1619, 1676, 1591, 1758]

2.3 Division
[209, 238, 223, 322, 348, 438, 1017, 1064, 1311, 1403, 1567, 1645, 1623, 1606, 1770, 1890, 2015, 1994, 2387, 2777, 2722, 2967, 3016, 7276, 2949]

3 Elementary functions, general
[384, 398, 586, 650, 615, 1122, 1265, 1627, 1656, 1756, 1719, 1717, 1794, 1840, 7195, 1945, 2051, 2154, 2098, 2277, 7214, 2560, 2597, 2547, 3334, 2549, 2518, 2697, 2850, 2661, 2812, 2813, 2690, 3367, 3335]

3.1 Elementary functions, CORDIC and related algorithms
[190, 191, 248, 264, 373, 523, 551, 659, 651, 667, 733, 855, 1068, 1084, 1293, 1451, 1699, 1897, 1708, 1811, 1963, 2159, 2381, 2310, 2541, 2567, 2716, 2810, 3010, 3005, 3128, 3068, 3114]

3.2 Elementary functions, function approximation
[240, 241, 481, 623, 768, 767, 983, 1021, 1162, 2000, 2052, 2610, 2685, 2783, 2784]

3.2.1 Polynomial evaluation
[259, 279, 304, 426, 1061, 1228, 2351]
3.3 Square root, general
[1082, 1187, 1481, 1598, 1651, 2565, 2677]

3.3.1 Square root, bit-oriented, iterative, and table methods of computation
[120, 153, 359, 1022, 1008, 1151, 1353, 1444, 1406, 1372, 1426, 1537, 1825, 1922, 1834, 1887, 1971, 1952, 2035, 2006, 2046, 2089, 2139, 2179, 2253, 2390, 2577, 2534, 2709, 3038]

3.3.2 Square root, Newton’s method

3.4 Sine and Cosine
[180, 1068, 1018, 1023, 1176, 1398, 1544, 1666, 1665, 1765, 1853, 1953, 2120, 2231, 2606, 2961, 2958, 2880, 2980, 3074]

3.5 Logarithm
[154, 271, 331, 690, 998, 1112, 1299, 1529, 2107, 2108, 2607, 2735]

3.6 Exponential function
[141, 409, 1183, 1361, 1518, 1748, 1847, 2470, 2608, 3002]

3.7 Arctangent
[143, 160, 207]

3.8 Other transcendental functions
[499, 613, 161, 1024, 365, 275, 360, 2100, 1157, 2860, 3054]

4 Binary-decimal conversion
5  BCD arithmetic

[674, 726, 777, 778, 779, 780, 781, 782, 783, 1382, 1492, 1705, 1640, 2037, 2646, 2960]

6  Multiple precision arithmetic

[292, 330, 410, 428, 632, 616, 953, 1002, 1099, 1265, 1350, 1430, 1542, 2805, 2789, 3033, 3224]

7  Conferences on computer arithmetic

[7134, 7144, 7149, 7158, 7161, 7192, 7193, 7235, 7265, 7273, 7267, 7299]

8  Additional contributions from Nelson H. F. Beebe


Title word cross-reference

#26 [5490].

\[( (2^n)^m ) [3797]. \ (10^{41} - 1)/9 [1976]. \ (2^n) [4350, 4371, 4555, 4564, 4469]. \ (2^n + 1) [1081, 4788, 3910]. \ (2^n - 1) [5007]. \ (2^n - 1, 2^n+p, 2^n + 1) [6270]. \ (2^n \cdot 2^n) [6076]. \ (2^n \cdot 2^n) [5517, 4137]. \ (2^n) [4434]. \ (2n + 3) [6525]. \ (2n - (2p + 1)) [4850]. \ (a \cdot x) \cdot x? [6799]. \ (d, r) [789]. \ (M, p, k) [5803]. \ (R) [2908]. \ (p) [4390, 4434]. \]
8

ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

7

(x + y) ∗ (x − y) [6672]. −2 [743, 183, 206, 949, 801]. −∞ < n < +∞ [141, 160].
0 [5635]. 0 < N < 1 [161]. 0 ÷ 0 [699].
$1 [3739]. 1 [4987, 4343, 5152,
√
5636, 3694, 2165]. 1, 000, 000 [618]. 1/ x [5774]. 1/t [2174]. 10 [530, 6007].
[1005, 4301, 2049, 5672, 3229, 3991, 618, 6040, 430, 4343, 5008, 3283, 3459, 1760,
3469, 3140, 3476, 5610, 3491, 530, 321, 3681, 3816, 4450, 3694, 5096, 3361, 4940].
2, 576, 980, 370, 000 [5637]. 22n + 1 [2146]. 256 [4437]. 27 [433]. 2( n + 1) + 1}
[3968]. 22n+1 − 1 [6022]. 22n+2 − 1 [6022]. 22q [6012]. 28 − 1 [2856]. 2k
[4482, 4995, 5497, 5036, 5044]. 2k + 1 [866]. 2k−1 [4482]. 2m [4556]. 2n
[1568, 6022, 3968]. 2n + 1 [3968, 4987, 5716, 4460]. 2n+1 − 1 [6515]. 2n+k
[6515]. 2n − (2n−2 + 1) [5339]. 2N − 1 [2987, 4823, 6515, 4213, 3968]. 2q − 3
[7007]. 2q ± 1 [6012]. 2q ± 3 [6012]. 2x py ± 1 [6238]. 2 × 2 [5909]. 3 [377, 4989,
4178, 430, 4034, 4202, 4039, 5028, 4873, 321, 6207, 4118, 6599, 4937, 4938].
3 − j [298]. 32 [3984, 4437]. 3 × 3 [2493]. 4 [3968, 4315, 4659, 2521, 2522, 430,
3428, 5721, 5523, 4382, 4715, 2950, 4072, 4074, 2811, 3001, 1932, 3524, 3529].
$49.95 [3706]. 5 [6012, 4800]. 54 × 54 [3483]. 6 − j [298]. 64 × 64 [2278]. 8
[433, 3441, 4072, 3491]. 84 [307]. $85.00 [4142, 4143]. 88062 [530]. 8k [6836].
8 × 8 [5096]. 9 − j [298]. < [6215]. > [6215]. [0, 1] [5152]. 0 [4356]. 2 [5734]. 4
[2796]. 5 [3897]. e [1159]. th [1159]. T M [4626]. A(N + C) [1910]. a + b [3638].
a+b+c [6296]. AB +CAB +C [6944]. ab+cd [6091]. ab+cd+e [7085]. a·(x· x)
[6799]. A ·p
T [4065]. arctan Z [143]. a × b + c × d [6296]. β [6327, 7050]. C + AB 2
[4280]. c/ (a2 + b2 ) [6278]. CLP(R) [2928]. cos−1 [3128]. cos N [180]. cos x
[373]. cot−1 x [373]. d [4693, 5500, 3803]. ∆02 [4941]. e [459]. en [141]. ex [409].
 [3472]. ηT [5664]. ηT [5244]. exp(x) [1361]. exp x [373]. f (x) = 0 [1222]. Gα
[809]. GF(2)[x] [5857]. GF (2m ) [4404, 4772, 4387, 6041, 4974, 5430, 4905, 5861].
GF(2n) [4199]. GF (pm ) [4651]. H [5169]. I 2 L [3238]. ∞/∞ [5015]. K
[5438, 4301, 5911, 2107, 5995, 6327, 5952]. k < m [6327]. L [4343]. L2 [5252].
L∞ [5251, 6974]. l2 [6051]. ln(x) [1529]. ln x [373]. log n [1228]. log Z [143].
LU [6788, 6547]. M [4837, 180, 4132, 2626, 2631, 2640, 2918, 5333, 581, 6327].
M E mod N [2776]. F2 [X] [7049]. f2m [4229]. F55n [5681]. F77n [5681]. Rn
[6897]. Z2 [4060, 5035]. GF(2) [5307, 1692]. GF(24 )2 [6154]. GF(24n ) [3921].
GF(28 ) [6154]. GF(2k ) [4962, 3768, 4920]. GF(2m ) [5480, 4672, 4980, 3873,
4526, 5141, 3581, 4532, 3884, 5509, 2896, 2897, 3752, 4860, 5307, 5170, 4714,
4385, 5032, 2428, 5431, 4604, 4745, 4906, 5435, 3198, 4280, 4935, 4771, 2308].
GF(2n ) [4994]. GF(p) [2081]. GF(pm ) [3487]. GF(pk ) [4647]. GF(qn ) [4695].
MECIPTI [282]. µ [1426, 4866, 4908, 2309]. µP [1610, 2008]. N [3963, 808,
2333, 2334, 160, 161, 180, 4575, 5068, 4926, 5952, 5683, 4159, 6051, 1294, 3622].
nième [1159]. N00 = −N0−1 mod W [4257]. N ≥ 32 [5846]. n log(n) [6463]. n × n
[3139]. O(1) [6363]. O(n) [1195, 3431, 1547]. O(n2 ) [2777, 2778]. O(n log n)
[1915]. P [6503, 4636, 2059, 1130, 894, 1044, 1635, 7050, 4273, 4622, 3349]. pk
[6680]. π [1630, 2233, 2234, 4601, 268, 5637, 1693, 459]. p × p [4580, 4724]. q
[5776]. q∗m − n [1628]. QR [6116]. R [3602, 3061, 1605, 1613, 6406, 5846].
r = mk [1438]. ra [4945]. rb − 1 [4945]. rc + 1 [4945]. {rn − 2, rn − 1, rn } [5298].


$r \geq 8$ [5846].

-2 [1004]. $\text{-adic}$ [1130, 1044, 1635, 2059, 894].

-Approximations [6974, 5251, 5252].

-ary [2918, 4132].

-Bit [3984, 6836, 307, 5952, 5068].

-body [4575, 4926].

-circulant [6406].

-Coordinate [4413].

-count [135x549].

-Depth [3431].

-Digit [433].

-Dimensional [5500, 2049, 4693].

-Fold [5438].

-Friendly [5803].

-function [5169].

-gram [5683].

-Matrix [4837].

-Moduli [6012, 3968, 4659, 4800].

-Norms [6051].

-Order [3602].

-Partition [5995].

-Real [4941].

-select [4159].

-sets [3061].

-spaces [4877].

-th [5911, 3803, 5776, 2334].

-transform [5330].

-Vectors [6051].

.NET [6416, 5071].

/ [4866]. /spl [4866].

0.18-CMOS [5770]. 0.4.1rc [6417]. 0.80pJ [6551]. 0.80pJ/flop [6551].

'00 [7375, 7380, 2540].

'01 [7389].

'03 [7418].

'04 [374x346].

'07 [7487, 7487, 7487, 7483].

'08 [7487, 3032, 5378].

1 [217, 3547, 6637, 3412, 2876, 228, 63, 65, 563, 3275, 6670, 4065, 4407, 1163, 5770, 7055, 1933, 3865].

1-GHz [6637, 4407, 5770].

1-Output [5344].

1.0 [3866].

1.24Tflop [6551].

1.24Tflop/sW [6551].

10 [5734].

10-ka/cm [5734].

10/20 [958].

100 [2889, 2890].

100-MFLOPS [2889, 2890].

1014 [6743].

1057 [1981].

10858 [1746].

10967 [4361, 5158].

10th [7185, 7519, 7267, 7396, 7409, 27, 7166, 2763].

11 [7514, 1110, 1391, 1507, 1408, 1312].

11-bit [4908].

11/780 [2036, 1569, 1570, 1803, 1019].

116 [270].

1164/WTL [2033].

11i [4923].

11th [7387, 7280, 7298, 7299, 3183].

120B [1120].

12-bit [6318, 1116].

12th [7430, 7496, 7141, 7322, 3454, 7482].

13 [4320, 2090].

12-Bit [342].

13th [7415, 7157, 7341, 7311, 7469, 3844, 3772, 7539].

14-Port [3915].

14th [7302, 7386, 7417, 7468, 7380, 7366].

15 [2766].

15-bit [4452].

15C [1629].

15th [7295, 7476, 7141, 7484, 7388, 7434].

16-19 [7105].

16-Bit [4531, 6678, 6693, 7065, 6836, 3023, 1260, 1601, 4992, 3076, 1759, 6317, 1476].

16-bit [1610].

16-bit-Multiplikation [1476].

16-by-8-bit [1645].

16-Digit [5364].

160-ns [2835].

160-Word [3915].

1620 [255].

164 [1815].

167 [3491, 3529].

16BST [1817, 1733, 1734, 1736, 1740, 1750, 1763, 1772, 1689].

16F/400 [917].

16th [7459, 7450, 4648, 7414, 7456].

17 [287, 838].

17-Bit [648, 647].

1788 [6539].

1788-2015 [6065].

17th [7521, 7461, 7377, 7451, 7454].

18 [7532, 562].

18-21 [7467].

18.Mai [1484].

18th [7486, 7475, 7481, 5470].
8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE


8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE


= [2799, 2800, 3343, 7131].

Additions from Nelson H. F. Beebe
ADDCONTRIBUTIONS FROM NELSON H. F. BEEBE

ADDERS/SUBTRACTORS

ADDITION [1382, 3391, 2324, 3866].

ADDITION-BASED [4995].

ADDITION-RELATED [5033].

ADDITION/SUBTRACTION [4155, 5914, 4716, 6931, 3857, 4662].

8  ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

Algorithm [2105, 569, 2107, 262, 640, 4725, 2113, 6903, 762, 2947, 1649, 1890, 2115, 2254, 5333, 2566, 6187, 6427, 1654, 1897, 4411, 2774, 2960, 4413, 1532, 1661, 2777, 2778, 3660, 5997, 4897, 5427, 5761, 1157, 2589, 6103, 4903, 923, 2139, 924, 7052, 775, 4610, 1243, 2015, 5631, 6005, 372, 3815, 4113, 3184, 4118, 4448, 5088, 1693, 6208, 456, 4456, 2822, 3518, 2155, 489, 5555, 5776, 5860, 5948, 595, 3698, 1478, 244, 3206, 3531, 5107, 4279, 2630, 1710, 603, 2173, 2040, 4782, 6463, 3549, 3850, 5240, 6357, 3399, 1582, 1720, 4802, 2661, 2662, 3403, 5128, 3229, 2669, 2507, 3980, 3567, 3412].


algorithm-based [2246, 3513, 3199, 3361, 3371].

Algorithmen [2393, 2231, 2567, 1699, 2300].

Algorithmen [4674, 5322, 4341, 2756].

Algorithmic [5813, 7463, 3897, 252, 3656, 2796].

Algorithms [850, 2037, 6616, 4142, 4143, 722, 1805, 3848, 855, 665, 1011, 6850, 7444, 3223, 5381, 5668, 6237, 1265, 1375, 5387, 5389, 1584, 275, 3055, 6246, 3863, 4668, 1105, 5806, 2874, 4519, 4520, 4674, 3243, 4521, 3728, 6040, 1022, 1023, 1024, 1112, 6878, 5398, 3072, 4007, 4173, 6499, 5141, 2071, 2359, 6768, 6769, 5497, 3074, 467, 3738, 736, 823, 877, 6655, 1517, 6050, 5504, 883, 4190, 5151, 2534, 7488, 4198, 4357, 3604, 4546, 3605, 3888, 1519, 1412, 1521, 3273, 4025, 4705, 4706, 3098, 3099, 5726, 2541, 3100, 6168, 6675, 2393, 2231, 4214, 827, 521, 1420, 3899, 7511, 522, 6680, 3111].

Algorithms [4557, 3289, 4376, 630, 5829, 5314, 2930, 1528, 4061, 3120, 2933, 3295, 7333, 7453, 1049, 6798, 3636, 1639, 1887, 686, 1640, 690, 1641, 4878, 7211, 7225, 4398, 5045, 4582, 3299, 447, 356, 476, 463, 3043, 5049, 4404, 2567, 3790, 7033, 4408, 1322, 3793, 3315, 1440, 3797, 1443, 4249, 1444, 1770, 5998, 2789, 3802, 7282, 6000, 6812, 5988, 5939, 7270, 6927, 4608, 774, 2456, 3502, 5345, 925, 7055, 7056, 711, 3682, 373, 4112, 1341, 2603, 2812, 2813, 5774, 5859, 3005, 939, 2828, 3828, 1699, 2300, 5558, 3359, 4173, 3367, 7093, 5106, 5375, 551, 3209, 1083, 3548, 5461, 5958, 4964, 4964].

algorithms [4308, 5124, 6130, 6235, 6745, 6854, 7233, 2664, 2199, 221, 3859,
ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

7331, 5305, 4370, 2921, 5168, 1139, 5410, 312, 7223, 6541, 6893, 6544, 7021, 5835, 4577, 1432, 4877, 6312, 6695, 4890, 7311, 2128, 3801, 4422, 5197, 7178, 6435, 1539, 372, 2289, 1553, 6939, 7131, 6610, 4814, 7301, 6951, 1185, 3022.

applications [1485, 2312, 5957, 3220, 1490, 4151, 7387, 7233, 5682, 2056, 5881, 2335, 1727, 3417, 3729, 6649, 2684, 6255, 1839, 2365, 5143, 4698, 4023, 5006, 6509, 4196, 5717, 7085, 5977, 6403, 3103, 3450, 748, 2415, 7295, 2932, 7209, 2588, 2942, 316, 4887, 4592, 3148, 2585, 5765, 7166, 5943, 3501, 3511, 2018, 790, 455, 17, 3190, 7285, 1351, 5780, 1704, 5372, 1975, 1700, 7131].

Applied [7302, 7179, 548, 1194, 3562, 6384, 1128, 7462, 5006, 7522, 7105, 5344, 7197, 7539, 2045, 2319, 2710, 3613, 7462, 7432, 7519].

Approach [6735, 6021, 4146, 3392, 4313, 1723, 1103, 5264, 3574, 6496, 5279, 6500, 5812, 1840, 5701, 736, 6156, 5512, 7248, 7329, 7401, 7518, 6517, 1539, 372, 2289, 1553, 6939, 7131, 6610, 4814, 7301, 6951, 1185, 3022, 1918, 790, 455, 17, 3190, 7285, 1351, 5780, 1704, 5372, 1975, 1700, 7131].


1816, 1100, 5256, 6134, 1820, 4668, 5130, 5482, 1019, 2877, 6249, 4981, 6879, 4172, 1970, 6152, 5144, 1517, 4350, 6262, 2708, 4025, 3599, 7249, 5155, 7249, 7264, 7403, 4705, 4706, 6277, 6400, 6405, 5735, 2094, 2916, 3618, 4216, 4556, 1422, 4559, 4561, 6072, 5312, 6172, 1312, 1881, 4228, 3296, 6313, 6319, 2949, 7310, 4241, 6804, 6912, 3315, 7252, 5935, 5997, 4256, 4897, 5425, 6922, 6700, 6103, 993, 4605, 2993, 7228, 1679, 6575, 4434, 6931.

Architecture [2803, 2985, 3507, 6708, 2150, 5214, 5358, 1467, 5776, 5948, 1469, 3360, 3362, 6214, 7074, 6716, 6830, 4772, 6718, 1083, 4488, 6459, 2636, 4782, 3386, 1810, 5804, 2661, 3229, 3051, 4164, 4672, 2347, 2064, 7181, 2367, 6994, 4842, 1972, 3593, 5514, 2222, 7129, 4707, 2722, 5405, 2228, 2229, 2395, 2396, 2402, 2546, 4218, 2736, 2412, 2413, 3902, 2241, 3774, 2420, 4873, 3910, 1760, 4874, 2559, 2754, 2755, 2252, 5418, 5611, 5057, 2570, 3657, 480, 2265, 4260, 3666, 6195, 2587, 2588, 1062, 7166, 5070, 2281, 5773, 3514, 935, 1339, 4759, 4763, 1788, 2295, 3198, 1704, 2163, 6011, 3374, 4852] Architecture [2109, 2248, 7358].


8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

6742, 6969, 5125, 3046, 1717, 5670, 6238, 6473, 6027, 809, 861, 1097, 1098,
1099, 1192, 1264, 2866, 196, 6976, 7494, 5673, 6476,
7147, 2329, 6635, 7388, 7529, 4316, 1194, 23, 2195, 171, 2053, 2054, 1721, 5473,
3559, 2198, 612, 6979, 668, 1821, 6976, 7494, 5673, 6476,
7147, 2329, 6635, 7388, 7529, 4316, 1194, 23, 2195, 171, 2053, 2054, 1721, 5473,
3559, 2198, 612, 6979, 668, 1821, 6976, 7494, 5673, 6476,
7147, 2329, 6635, 7388, 7529, 4316, 1194, 23, 2195, 171, 2053, 2054, 1721, 5473,
3559, 2198, 612, 6979, 668, 1821, 6976, 7494, 5673, 6476,
7147, 2329, 6635, 7388, 7529, 4316, 1194, 23, 2195, 171, 2053, 2054, 1721, 5473,
8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

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propagate.

Canada

Canadian

Calculators [726, 1021, 4373, 4275, 3460, 107].
calculator [29, 40, 108].
calcul [40, 3151].
calculus [7088].
Calgary [7507].
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Modulator

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Monterey

MOPS

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Morphable

MORUS

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Most

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Motivations

Motorola

Motorola-Form

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6212, 6446, 2299, 3948, 6713, 215, 6346, 1469, 1701, 2617, 5100, 5223, 5367, 5368, 5559, 5560, 5641, 5644, 6448, 1556, 1354, 2033, 5781, 7073, 3011, 3012, 5950, 216, 3201, 2302, 6214, 4281, 6115, 1797, 4468, 5226, 2625, 799, 3019, 1706, 3529, 5374, 5784, 4136, 948, 1941, 6830, 6831, 5953, 6609, 5107, 5563, 5648, 5108, 5375, 5232, 6611, 5693, 5887, 6035, 6760, 6424, 6341, 4279, 2172, 4489, 3375, 5376, 662, 2851, 2630, 1943, 1944, 6450, 6953, 3957, 1564, 4484, 5651, 6216, 3023, 2170, 2171, 3705, 3842, 5456, 416, 5457, 5246, 5960, 6235, 6968, 3717, 6969, 1578, 1579, 1716, 299, 2187, 1718, 666, 5249, 5571, 4311, 3853, 1015, 4795, 5252, 5384, 5572, 6971, 6972, 7080, 2188, 1016, 1193, 6475, 4979, 4971, 6361, 5804, 6634, 3226, 4972, 3556, 2503, 1815, 4798, 2190, 2656, 6363, 6364, 1954, 6479, 1377, 6480, 3401, 6242, 1378, 4802, 4973, 2661, 3228, 379, 1585, 2662, 6365, 3856, 4976, 1818, 2056, 2665, 3723, 3858, 5881, 1380, 1722, 2200, 2666, 2667, 2668, 5962, 6029, 2335, 3050, 4509, 5479, 3979, 3051, 3980, 5963, 4804, 4805, 3983, 1501, 1589, 1824, 2202, 5481, 5687, 6136, 4162, 2674, 1104, 1961, 3989, 4671, 4516, 421, 2062, 5484, 3412, 5689, 3726, 2342, 2870, 2871, 2872, 3866, 3995, 3237, 6252, 2679, 6253, 5393, 5394, 5959, 1276, 2681, 6375, 5966, 5694, 3059, 2878, 3241, 3416, 4522, 4676, 4817, 6140, 6038, 3998, 3061, 249, 4821, 5137, 5267, 5268, 4336, 4679, 961, 4525, 5580, 6649, 5139, 2516, 5272, 2517, 4986, 2348, 4169, 2882, 5273, 2205, 502, 1733, 1734, 1832, 2884, 4001, 1202, 1394, 5275, 5140, 5492, 734, 1116, 4992, 4147, 4715, 6682, 4686, 4687, 5583, 4688, 1512, 1968, 2360, 1736, 4689, 1969, 735, 819, 508, 821, 3737, 6653, 6992, 1204, 5282, 1029, 2073, 6258, 2890, 2364, 4835, 2524, 6654, 4693, 5814, 4694, 282, 3076, 3252, 4696, 4838, 5815, 3077, 2526, 621, 879, 1030, 1208, 1739, 3428, 2368, 2892, 3078, 1031, 2702, 1843, 5502, 967, 1844, 2530, 1845, 5703, 2370, 4841, 4842, 1846, 5400, 5975, 6052, 6505, 1287, 1610, 2371, 252, 178, 307, 2706, 3882, 2375, 1850, 4531, 4845, 3883, 2532, 4022, 6661, 6662, 3080, 4023, 3745, 5004, 3593, 5820, 6999, 4024, 4540, 4700, 6509, 3750, 5150, 2894, 2895, 3255, 3595, 4192, 6392, 1036, 3083, 3434, 3596, 1291, 1407, 5009, 1213, 1974, 3598, 2219, 3435, 1408, 1296, 3260, 3090, 4030, 2220, 3440, 5514, 4548, 2900, 2535, 3091, 1298, 2711, 5295, 5296, 1744, 6665, 2903, 6397, 6522, 6667, 5717, 3265, 3266, 2084, 5718, 516, 2717, 826, 1215, 2383, 5720, 681, 2385, 3891, 1218, 1863, 7005, 1746, 3275, 3608, 4207, 5158, 5159, 5161, 5515, 2223, 2224, 4034, 4551, 5301, 3607, 1133, 4206, 1219, 1866, 2386, 4707, 5906, 2906, 4553, 5728, 5729, 1624, 3278, 5977, 6166, 6279, 6280, 6403, 2389, 201, 2088, 4039, 3611, 5978, 6407, 2227, 2911, 3102, 3279, 5979, 2229, 2395, 2396, 2230, 3103, 1985, 626, 2092, 2093, 3449, 3614, 3615, 4210, 4212, 5734, 4709, 2915, 3281, 3451, 3617, 3282, 6069, 628, 473, 744, 2399,
8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE


point [917, 5614, 7035, 5419, 2441, 2442, 984, 4243, 3309, 4731, 2959, 3144, 6190, 3310, 3311, 3920, 4077, 2446, 3796, 4891, 6916, 2570, 3316, 580, 4892, 5336, 5847, 6192, 480, 4245, 3146, 3147, 5337, 5539, 6098, 5848, 985, 4248, 4083, 4251, 5759, 765, 986, 3799, 4084, 7044, 4737, 5046, 2252, 5326, 3135, 6688, 7028, 1646, 6689, 3138, 1647, 1648, 695, 2563, 2253, 5753, 5841, 5328, 4882, 5048, 5330, 5332, 5416, 5535, 6905, 2564, 1999, 3914, 5051, 5418, 319, 1894, 2255, 2435, 2438, 2440, 2762, 3647, 5092, 1437, 3915, 2117, 2954, 2955].

point [2994, 4615, 1690, 2288, 1169, 2467, 2468, 4441, 4442, 4617, 5081, 5082, 5083, 5204, 5205, 5206, 5207, 5208, 5350, 5351, 5352, 5353, 5442, 5443, 5444, 5445, 5446, 2809, 2996, 1784, 1460, 2291, 292, 1461, 2024, 2025, 4759, 3689, 4116, 375, 323, 4271, 4761, 845, 2817, 2818, 3186, 3187, 6207, 5089, 1928, 3690, 4762, 4119, 147, 146, 1787, 1930, 2294, 1934, 1788, 3003, 5213, 6335, 3004, 1696, 846, 3346, 4452, 4924, 1071, 3348, 1346, 4122, 7069, 4277, 7092, 1791, 3692, 1792, 3827, 5360, 1697, 1936, 3190, 4125, 4278, 2029, 941, 6339, 2826, 2827, 4927, 4928, 715, 794, 3693, 1075].

point [5552, 1793, 2615, 2476, 2478, 3695, 4458, 4459, 1350, 2031, 6445, 5221, 1351, 2829, 2160, 492, 2481, 849, 1702, 3950, 2484, 3007, 4768, 4933, 5222, 5369, 5780, 6009, 6213, 2485, 1795, 1471, 1472, 1473, 1474, 1703, 1355, 1796, 540, 541, 542, 3952, 2162, 2301, 5101, 795, 2034, 2486, 2487, 1255, 294, 1704, 2163, 3202, 3365, 1938, 1559, 2304, 2836, 2488, 1356, 2621, 2622, 4129, 5225, 1798, 1560, 4936, 5228, 5562, 5782, 5951, 947, 2624, 4131, 4282, 4937, 4938, 7075, 5783, 598, 797, 1357, 2841, 6945, 194, 2843, 2307, 6716, 2489, 2845, 2846, 3205, 3837, 7094, 5230, 4943, 4944, 5109, 5111].

point [4634, 4774,
Possible

Posit

Postscaled

Postcorrections

Posteriori

Postscale

Postshifts

Power

pow
8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE 101

6881, 4184, 5708, 4543, 4547, 5012, 6167, 6528, 5914, 6287, 6793, 5836, 6549, 4072, 4073, 4730, 6189, 6694, 5058, 4415, 7043, 4256, 4422, 7370, 5617, 4433, 4093, 6331, 6202, 4095, 4101, 4912, 5769, 241, 3824, 5549, 6938, 5553, 6600, 6940, 5098, 5374, 6946, 6717, 6718, 4635, 4153, 4154, 4801, 3563, 4166, 5966, 6766, 6042, 4862, 3579, 619, 1287, 3882, 5904, 4187, 4847, 5713, 7002, 7003, 7084, 3889, 2919, 3902, 4235, 3783, 5057, 4074, 7434, 4591, 5759, 4914, 3690, 4277, 2611, 2613, 3196, 4465, 3362. Power-Delay [3720, 4730]: Power-Efficient [5476, 6331, 5553, 5374, 6042], power-series [2919].

POWER2 [3209, 3260, 3340, 3363, 3259]. POWER3™ [3956]. POWER6 [5274, 5116].


Pre-computations [5880]. Pre-processing [5701]. pre-scaling [3428].

Precisemon [5937]. Precise [2169, 3839, 2651, 6047, 3603, 4036, 4854, 6554, 3331, 5079, 5080, 4463, 5134, 2224, 6190, 5448, 5449, 4380, 4221]. precisie [491].

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[508]. Probability [494, 385, 4577, 2746, 3896, 6311, 1647, 1648, 5049, 6816, 7058, 7060, 2874, 5708, 2901, 394, 6668, 3896, 6311, 1647, 1648, 5049, 6816, 7058, 7060, 2371, 6999, 393, 5537].

Problem-Solving [1983]. Problems [602, 6354, 2502, 3987, 617, 7125, 1843, 2704, 179, 2377, 6999, 393, 5537].


Proceedings [7127, 7145, 7151, 7231, 7232, 7242, 7359, 7373, 7456, 7103, 7097, 7153, 7244, 7289, 7345, 7374, 7273, 7398, 7316, 7360, 7459, 7339, 7386, 7191, 7143, 7246, 7304, 7346, 7415, 7305, 7291, 4825, 7235, 7171, 7476, 7260, 7185, 7534, 7218, 7098, 7192, 7144, 7156, 7161, 7172, 7174, 7199, 7220, 7221, 7239, 7251, 7261, 7262, 7263, 7276, 7277, 7278, 7292, 7294, 7307, 7308, 7352, 7375, 7377, 7389, 7391, 7405, 7433, 7476, 7480, 7537, 7544, 7206, 7321, 7157, 7265, 7358, 7175, 7223, 7332, 7158, 7309, 7295, 7406, 7296, 7637, 7378, 7407, 7421, 7438, 7354, 7408, 7105, 7195, 7310, 7190, 7396, 7133, 7281, 7282, 7164].


Processing [1708, 6835, 3021, 6954, 7289, 7345, 7249, 1573, 3551, 7215, 6477, 301, 2663, 6860, 4511, 3572, 6987, 5582, 2208, 3422, 882, 1742, 6776, 3081, 6515, 563, 7249, 7198, 7264, 7293, 7404, 7418, 7435, 7437, 3096, 3097, 4202, 4141, 6671, 3101, 6405, 1134, 3612, 2545, 1139, 4713, 7223, 7158, 7333, 7453, 7024, 6308, 5325, 7122, 145, 915, 6912, 2124, 6922, 3669, 7270, 1540, 4753, 6929, 7057, 7371, 2984, 7297, 6580, 3178, 1171, 6827, 7539, 5951, 3214, 2177, 1088, 2644, 7328, 2332, 2335, 3861, 6642, 2679, 4677, 7291, 4992, 7124, 2366, 5701, 5973, 2369, 1610, 3080, 6509, 3255]. processing [6392, 5009, 3257, 4034, 6670, 2722, 3277, 1302, 1039, 7111, 3451, 2235, 2920, 1987, 1870, 1989, 1991, 2412, 2924, 4866, 2932, 7209, 7367, 7378, 7394, 7407, 7421, 7438, 2558, 2942, 2563,
8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

7121, 2964, 4592, 3146, 3147, 2261, 7311, 2585, 838, 5767, 5198, 2804, 4107, 3511, 2018, 6582, 3003, 1347, 7240, 7285, 3196, 1795, 1177, 2486, 2832, 1704, 4282, 4939, 2848, 2849, 2682.


7211, 2964, 4592, 3146, 3147, 2261, 7311, 2585, 838, 5767, 5198, 2804, 4107, 3511, 2018, 6582, 3003, 1347, 7240, 7285, 3196, 1795, 1177, 2486, 2832, 1704, 4282, 4939, 2848, 2849, 2682.


Profession [4703]. Professor [159]. Profile [5881]. profiles [5896]. Profiling [6648]. Program [3383, 6224, 6729, 6841, 2495, 1092, 1506, 6532, 3287, 566, 2548, 5530, 2781, 4911, 6587, 1075, 3836, 5874, 5800, 6634, 3980, 1597, 1730, 282, 1516, 1298, 2714, 7500, 4366, 2233, 2234, 1225, 4222, 5987, 1645, 5181, 3914, 985, 706, 6204, 3344, 292, 1254, 5110]. Programmable [7426, 7443, 7430, 7459, 7473, 7415, 3248, 7419, 7497, 6171, 3122, 3462,
ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE


Radix [2039, 5568, 3961, 4144, 1568, 545, 852, 3219, 855, 5959, 4630, 6361, 6362, 6855, 6977, 1581, 5677, 2504, 1957, 5476, 1613, 5008, 7083, 1617, 1132, 2087, 5721, 5300, 6402, 6165, 6167, 2391, 1423, 3112, 6070, 630, 5916, 5917, 3458, 4382, 4715, 5312, 4061, 6685, 1883, 6302, 7022, 3464, 3469, 1146, 5531, 358, 3302, 4069, 2566, 4072, 5756, 1438, 643, 3792, 5335, 3485, 646, 5425, 4391, 3492, 1774, 2138, 267, 3812, 4437, 5074, 1918, 932, 3816, 1785, 6708, 1932, 1933, 4120, 4450].

Radix [4451, 1174, 2155, 6007, 5862, 3524, 543, 3529, 6947, 600, 801, 1004, 3845, 950, 460, 3220, 4301, 1713, 4307, 4315, 2508, 3991, 423, 2522, 3071, 2359, 3579, 3428, 7000, 3441, 2384, 2226, 2911, 3102, 3279, 889, 2733, 2925, 2927, 4055, 3459, 1760, 2433, 2760, 2950, 3140, 3476, 4403, 4074, 2776, 5846, 4081, 4246, 4247, 4736, 4596, 4740, 4741, 2975, 5436, 3166, 3167, 3169, 3170, 5075, 3514, 2811, 3001, 1172, 3832, 5561, 5642, 2840, 1746].

Radix [1568, 2504, 1725, 1824, 6040, 2521, 1605, 1613, 5008, 4382, 4715, 4391, 4437, 1932, 4450, 6007, 3524, 3529, 4301, 4315, 3991, 2522, 3428, 3441, 3459, 1760, 3476, 4074, 2811, 3001]. Radix-10 [5312]. Radix-16 [733, 5756, 5862].


recompilation [4988]. Recompiling [6148]. ReConFig [7495].
Reconfigurable [3708, 3970, 6367, 1821, 7495, 7403, 3447, 4559, 4582, 6696, 5767, 6575, 4456, 5644, 4470, 4772, 5953, 5375, 5887, 6981, 5869, 4151, 4307, 4507, 2212, 4393, 5418, 2261, 4607]. reconfiguration [6042, 4549].
Recompiling [4988]. ReConFig [7495]. Reconfigurable [3708, 3970, 6367, 1821, 7495, 7403, 3447, 4559, 4582, 6696, 5767, 6575, 4456, 5644, 4470, 4772, 5953, 5375, 5887, 6981, 5869, 4151, 4307, 4507, 2212, 4393, 5418, 2261, 4607]. reconfiguration [6042, 4549].
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3969, 2195, 4506, 4801, 6857, 1957, 220, 3860, 6378, 177, 226, 337, 6048, 884, 1404, 1742, 253, 5007, 5712, 229, 4850, 5298, 1617, 1523, 1625, 1134, 1135, 1418, 1631, 1871, 7010, 3452, 749, 827, 3767, 287, 905, 4234, 4578, 2425, 5325, 5180, 3133, 317, 1649, 1764, 918, 2775, 4591, 1904, 2124, 1906, 6920, 2782, 2130, 2971, 3154, 3489, 1673, 583, 1911, 454, 484, 2146, 2018, 5078, 712, 2603, 455, 6208.


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3968, 3969, 4313, 5193, 6707, 1710, 4659. Reverse-Carry [4313]. Reversed
[2104, 2243]. Reversible [5302, 5163, 5931, 5996, 5214, 5215, 7090, 5216].
reversion [2243]. Review [1483, 3706, 4142, 4143, 21, 4665, 4320, 509, 388,
Revised [7530, 7417, 7541, 7488, 7516, 7519, 3897, 7539, 5838, 2796].
Revision [3865, 6524, 7028, 6188]. Revisions [4751]. Revisit [5877]. Revisited
[3224, 279, 1121, 2372, 4848, 4576, 5059, 4263, 4917, 5085, 4399, 6062,
4886]. Revisiting [4712, 5173, 5174]. Revolution [1533, 1662]. rewriter [5899].
Rewriting [6814, 5362, 3358]. REXX [1728]. Reykjavík [7519].
Rezension [4849]. RF2P [7040]. Rhine [7303]. RHW [4470]. Rhyne [2465].
Richard [509, 7483, 5864, 5865]. Richardson [384, 384, 6647]. Richardson-
Algorithmus [384]. Rietz [7147]. Robertson [7293, 7437]. Ring [3044, 176, 7061, 6944, 1826, 4710, 2030].
Ring-LWE [6944]. Rings [3792, 7102, 1261, 3573, 2596]. Ripple [5676]. Ripple-Carry
[5676]. RISC [6470, 2535, 2540, 2560, 2564, 6953, 6622, 6964, 6738, 6853, 2654,
6637, 4661, 2336, 6891, 6892, 2924, 7014, 6551, 7024, 6899, 6900, 6901, 3296, 2252, 6559, 2951, 2439, 3915,
7036, 7040, 7041, 3148, 7043, 6100, 7045, 6810, 2274, 6703, 7062, 1546, 2604,
6595, 6822, 6938, 6939, 3363, 2623, 7075, 6945, 6716, 6830, 3352]. RISC-Based
[4699]. RISC-V [6470, 6622, 6964, 6738, 6853, 6637, 7067, 6830, 6772, 6773,
6891, 6892, 7014, 6551, 7024, 6999, 6900, 6901, 6595, 7036, 7041, 7043, 6810,
6703, 6595, 6822, 6939, 7075, 6945, 6716, 6830]. RISC-V-Based
[7045, 6938, 7062]. RISC-V3 [6810]. RISCs [1546, 2633, 3341]. Rise [6272].
Rising [6775]. Risk [7059]. RLS [2630, 2040, 5419]. RLWE [6615]. RLWE-Based
[6615]. RN [4964, 4863, 5025, 5168]. RN-coding [4863, 5025]. RN-Codings
[5168, 4964]. RNC [7458]. RNC3 [7346]. RNC5 [7413]. RNC6
[7425]. RNS [5815, 6194, 7064, 4946, 5235, 4639, 5792, 3702, 3850, 4783, 5462,
5873, 6021, 6124, 6849, 6127, 4658, 3988, 4511, 4667, 6488, 5091, 4816, 3417,
6874, 3871, 4696, 2354, 4177, 5701, 5813, 4016, 4535, 6507, 3754, 4029, 4917,
4545, 6270, 6515, 3268, 3269, 3889, 7010, 3109, 2412, 6300, 4411, 4080, 6099,
5339, 2794, 4600, 1536, 7053, 5077, 2460, 4109, 5349, 6707, 4273, 1932, 3828,
4765, 7072, 5104, 6010]. RNS-based [7010, 5792, 4535, 7053, 4177]. RNS-to-weighted
[4109]. Road [2671]. Robert [43]. Robust [5799, 6991, 2934, 6903, 6429, 5340, 6574, 3162, 3680, 3513, 6963, 6754, 3868,
3871, 4822, 4048, 6578, 3679, 3813, 3530, 2935]. Robustes [2934, 2935].
Robustness [6724, 6237, 2377, 4910, 6130, 5814]. Rochester [7178, 4124].
Rocket [6710]. Roessler [3702]. Roger [2475]. Role [853, 2876, 7227, 4619].
roll [3034]. roll-up [3034]. ROM [7381, 3235, 5723, 1135, 2239, 2240, 896,
3160, 3500]. ROM-based [2240]. ROM-less [5723]. ROM-Rounding
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[2178, 5381, 6630, 6744, 4969, 5382, 6239, 1111, 5969, 6768, 6769, 2525, 6655, 6051, 3747, 6061, 1855, 6402, 5524, 5825, 4382, 6681, 6296, 3775, 6175, 6298, 2931, 450, 3164, 3335, 6110, 1348, 2850, 5955, 6854, 4795, 4976, 6971, 6972, 6973, 7079, 6245, 4807, 4982, 5577, 4330, 5283, 7002, 7003, 7084, 7085, 2092, 5596, 5597, 634, 3907, 4225, 6896, 636, 2430, 4729, 4250, 788, 4919, 4812, 5266].


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[135x681]8 ADDITIONAL CONTRIBUTIONS FROM NELSON H. F. BEEBE

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7393, 7482, 7194, 7226, 7189, 7311, 7439, 7441, 7539, 7131.


Signal-to-noise [1065].

Signaling [4630, 4631].

Signalling [5379].

Signals [3387, 7216, 7234, 7245, 7340, 1134, 7355, 7368, 7379, 7395, 7408, 7422, 7490, 7502, 7531, 7283, 7324, 3882].

Signed [6847, 377, 219, 1365, 664, 1819, 4318, 671, 5704, 5517, 4208, 6070, 4065, 2574, 3324, 489, 593, 3951, 2504, 4662, 4158, 3149, 5193, 3667, 2465, 5372].

Signed-Digit [219, 1365, 1819, 4318, 4208, 6070, 4065, 2574, 3324, 489, 593, 3951, 2504, 4662, 4158, 3149, 5193].

Signed-LSB [5517].

Signed-Number [671].

Significance [859, 1013, 1513, 283, 1747, 761, 832, 1053, 793, 1512, 1968, 178, 981, 1052, 787, 2612, 2613, 941].

Significand [5556].

significands [4021].

Significant [3032, 5378, 461, 5879, 55, 554, 54, 346, 7019, 162, 5932, 5616, 237, 847, 3951, 90, 2504, 4662, 4158, 5710, 4059, 3149, 5193, 3667, 2465, 5372].

Significant-digit [318].

Signs [3711, 3871].

SIGNUM [7145, 538].

SIGPLAN [7242, 7428].

SIKE [6651, 6767, 6537].

Silicon [5306, 6981, 2271].

SIMD [4289, 6122, 4782, 5670, 4976, 4981, 4336, 6771, 3584, 6995, 5718, 5821, 6699, 7048, 5549, 4282, 7075, 6211, 6341].

Similar [1699, 942].

Simple [857, 4793, 1267, 1376, 1602, 5496, 2888, 1517, 4537, 4547, 6520, 4550, 5164, 2548, 441, 572, 2760, 6192, 121, 1770, 649, 1452, 1794, 4654, 2677, 118, 5400, 1971, 6082, 2950, 452, 3190].

Simpler [4690, 4830].

Simplification [2838].

Simplified [5007, 5037, 1353, 3910].

simplify [4490].

Simplifying [3485].

simulated [5287, 7012, 759].

Simulating [6989, 6518].

Simulation [7398, 6471, 5810, 3576, 334, 2885, 5709, 635, 2936, 3650, 7166, 3159, 6331, 5722, 1943, 1944, 3563, 3059, 746, 1224, 1527, 1752, 4384, 5926, 980, 5342, 1449, 1934, 3004, 795, 353].

Simulation-Based [5709].

Simulations [6173, 6323, 5545, 6455, 5883, 5481, 5687, 6253, 6781, 4575].

Simulator [880, 3273, 1446, 879].

Simulink [5766, 3329].

Simulink-based [5766].

Simultaneous [4285, 6378, 1207, 253, 3602, 6416, 4608, 5241, 5722, 4251, 4446].

Sin [231, 1765, 2120, 536].

Sin/Cos [1765, 536].

Sine [1953, 1018, 1853, 4031, 2950, 1068, 2810, 2606, 952, 3277, 4722, 2961, 4245, 2120].

Sine-Cosine [1068].

sine/cosine [952, 3277, 4245].

sines [1398].

Singapore [7534, 7541, 7543, 7437, 7532, 7437].

Single [6953, 3214, 4294, 3711, 3047, 1270, 3413, 4819, 6145, 7081, 2080, 7006, 3893, 2095, 3452, 5026, 5828, 6411, 6172, 6295, 5319, 2932, 5751, 1149, 1655, 5062, 1673, 708, 3945, 6720, 6721, 4958, 1956, 5682, 2870, 2871, 2872, 4336, 2882, 625, 1867, 2922, 2239, 2240, 3777, 3630, 5925, 1760, 4875, 3783, 5611, 2257, 2271, 3677, 3175, 2602, 1928, 3526, 2849].

Single- [3893].

Single-Board [2080].

single-channel [2240].

single-chip [2870, 2871, 2872, 1928].

Single-Multiplier [4294].

Single-Precision [3711, 5319, 5062, 2932, 4875, 3677, 3175].

single-rail [3783].

single-term [5682].

Singular [3732, 4339, 3094, 1886, 4169, 4412].

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insert k <-- 0 after assertion, and also delete k <-- 0 from Table 6.

2. Table 9 (page 125):
   for -1:USER!(""); substitute -1:USER!("0"); and delete the comment.

3. Table 10 (page 125):
   for fill(-k, "0")
   substitute fill(-k+1, "0")


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Duprat:1991:NRR


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- medical expert systems,
- and others.

A realistic view of interval computations is taken: the articles indicate when and how overestimation and other challenges can be overcome. An introductory chapter explains the content of the papers in terminology accessible to mathematically literate graduate students. The style of
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The information on the Interval Computations homepage is basically a mirror image of the Kluwer one (the only difference is that the fonts are fancier).


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The main aim is to produce a usably efficient implementation, which can be easily interfaced with existing C++ code. This contrasts with previous implementations in functional languages (Haskell, Miranda etc.), which, although theoretically important, seem to be rather too slow for real use.

This code is designed as an add-on to Victor Shoup’s arbitrary-precision arithmetic package NTL, and implements a new type XR, to complement NTL’s ZZ and RR integer and real types.


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\[
p(n) = \frac{2}{\pi} \int_0^\infty \frac{\sin(x)}{x} x^{n+1} dx,
\]

and that function is always a rational number. Its values are

\[
p(n) = 1, 3/4, 2/3, 115/192, 11/20, 5887/11520, 151/315, 259723/573440, \ldots
\]

for \( n = 1 \) to 8.

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**Hormigo:2016:NFC**


**Hsu:2016:TPE**


**Hunhold:2016:UNF**


**Jaberipur:2016:FFC**

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- branch and bound algorithms for global optimization,
- constraint propagation,
- solution sets of linear systems,
- hardware and software systems for interval computations, and
- fuzzy logic.

Actual applications described in the book include:

- economic input-output models,
- quality control in manufacturing design,
- a computer-assisted proof in quantum mechanics,
- medical expert systems,
- and others.

A realistic view of interval computations is taken: the articles indicate when and how overestimation and other challenges can be overcome. An introductory chapter explains the content of the papers in terminology accessible to mathematically literate graduate students. The style of the individual, refereed contributions has been made uniform and understandable, and there is an extensive book-wide index. Audience: Valuable to students and researchers interested in automatic result verification. Detailed information, including contents, contributors, and an order form can be found:

- on Kluwer homepage http://www.wkap.nl, or

The information on the Interval Computations homepage is basically a mirror image of the Kluwer one (the only difference is that the fonts are fancier).


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(apart from the nine-page Chapter 15), it has extensive coverage of, and clever algorithms for, integer arithmetic operations that are fundamental for implementing hardware floating-arithmetic and software multiple-precision arithmetic.


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