A Bibliography of Publications on Floating-Point Arithmetic

Norbert Juffa
2445 Mission College Blvd.
Santa Clara, CA 95054
USA
Tel: +1-408-727-1885
FAX: +1-408-727-1265

E-mail: juffa@ira.uka.de (Internet)

Nelson H. F. Beebe
University of Utah
Department of Mathematics, 110 LCB
155 S 1400 E RM 233
Salt Lake City, UT 84112-0090
USA

Tel: +1 801 581 5254
FAX: +1 801 581 4148

E-mail: beebe@math.utah.edu, beebe@acm.org, beebe@computer.org (Internet)
WWW URL: https://www.math.utah.edu/~beebe/

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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.

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- 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 BibTE

Books, hardware oriented

[1721, 281, 1286, 1216, 3115, 3320, 1916, 841, 1164, 1000, 1457, 843, 1343, 7309, 7310, 1557]

Books, software oriented or theory

[1273, 466, 469, 470, 119, 1420, 2397, 908, 1049, 352, 2956, 2438, 2973, 2274, 320, 527, 7163]

Books, machine specific

[2177, 3221, 3117, 2440, 1767, 1903, 2293, 1935, 2475]

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

1 Choice of base, floating point formats

[498, 750, 752, 730, 727, 893, 1141, 1131, 2036, 2271, 2395, 2548, 2775, 2789]

1.1 Precision and Rounding

[433, 558, 745, 847, 881, 896, 964, 1032, 1041, 1045, 1194, 1296, 1435, 1376, 1538, 1729, 2284, 2460, 2533, 2846, 3162, 3285]

1.2 Determination of parameters of floating point arithmetic

[686, 823, 1636, 2277, 2203]

1.3 IEEE standards for floating point arithmetic

[993, 1197, 1223, 1206, 1234, 1196, 1203, 1340, 1326, 1327, 1280, 1300, 1458, 1385, 1409, 1387, 1725, 1824, 1862, 1863, 1860, 2087, 2174, 2343, 2577, 3057]

1.4 Floating point arithmetic, general and implementation issues

[633, 719, 1014, 1035, 1083, 1095, 1094, 1236, 1238, 1210, 1274, 1266, 1475, 1493, 1992, 2012, 2219, 2220, 2376, 2450, 2353, 2532, 2776, 2777, 2705, 2774, 3015]

1.5 Floating point packages

[1287, 1700, 1679, 1773, 1731, 1884, 1849, 1885, 1967, 2080, 2103, 2206, 2302, 2303, 2304, 2483, 2484, 1352]

1.6 Floating point units

[416, 1153, 1320, 1278, 1330, 1354, 1323, 1349, 1270, 1315, 1324, 1498, 1540, 1497, 1533, 1556, 1662, 1576, 1578, 1579, 1680, 1610, 1607, 1615, 1642, 1716, 1618, 1789, 1776, 1716, 1757, 1786, 1718, 1797, 2008, 1970, 1998, 1964, 2017, 1956, 1949, 1950, 2130, 2082, 2155, 2249, 2278, 2311, 2254, 2280, 2255, 2186, 2215, 2324, 2266, 2216, 2291, 2465, 2411, 2412, 2436, 2326, 2447, 2409, 2406, 2318, 2428, 2467, 2367, 2327, 2448, 2332, 2568, 2503, 2523, 2563, 2518, 2495, 2566, 2549, 2540, 2663, 2772, 2735, 2961, 2874, 2944, 3101, 3051, 3192, 3352]

1.7 Test of floating point routines

[500, 1454, 1726, 1870, 1869, 2020, 2021, 1965, 2107, 2473, 2601, 2609, 2677, 2676, 2792, 2771, 2757, 3056]

2 Addition and Subtraction

[375, 1513]

2.1 Floating-point Summation

[325, 345, 362, 361, 570, 639, 677, 831, 1661, 2279, 2356]

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, 2391, 2781, 2726, 2971, 3020, 7331, 2953]

3 Elementary functions, general

[384, 398, 586, 650, 615, 1122, 1265, 1627, 1656, 1756, 1719, 1717, 1794, 1840, 7250, 1945, 2051, 2156, 2099, 2281, 7269, 2564, 2601, 2551, 3339, 2553, 2522, 2701, 2854, 2665, 2816, 2817, 2694, 3372, 3340]

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, 2161, 2385, 2314, 2545, 2571, 2720, 2814, 3014, 3009, 3132, 3072, 3118]

3.2 Elementary functions, function approximation

[240, 241, 481, 623, 768, 767, 983, 1021, 1162, 2000, 2052, 2614, 2689, 2787, 2788]

3.2.1 Polynomial evaluation

[259, 279, 304, 426, 1061, 1228, 2355]

3.3 Square root, general

[1082, 1187, 1481, 1598, 1651, 2569, 2681]

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, 1955, 2006, 2046, 2089, 2141, 2181, 2257, 2394, 2581, 2538, 2713, 3042]

3.3.2 Square root, Newton's method

[158, 280, 302, 374, 347, 343, 383, 451, 427, 513, 518, 532, 596, 585, 579, 581, 702, 1328, 1317, 1397, 1583, 2337, 3022, 2951]

3.4 Sine and Cosine

[180, 1068, 1018, 1023, 1176, 1398, 1544, 1666, 1665, 1765, 1853, 1953, 2122, 2233, 2610, 2965, 2962, 2884, 2984, 3078]

3.5 Logarithm

[154, 271, 331, 690, 998, 1112, 1299, 1529, 2108, 2109, 2611, 2739]

3.6 Exponential function

[141, 409, 1183, 1361, 1518, 1748, 1847, 2474, 2612, 3006]

3.7 Arctangent

[143, 160, 207]

3.8 Other transcendental functions

[499, 613, 161, 1024, 365, 275, 360, 2101, 1157, 2864, 3058]

4 Binary-decimal conversion

[189, 173, 222, 475, 576, 684, 1165, 1291, 1292, 1405, 1654, 1709, 2002, 1975, 2513, 2605, 2529, 2860]

5 BCD arithmetic

[674, 726, 777, 778, 779, 780, 781, 782, 783, 1382, 1492, 1705, 1640, 2037, 2650, 2964]

6 Multiple precision arithmetic

[292, 330, 410, 428, 632, 616, 953, 1002, 1099, 1098, 1265, 1350, 1430, 1542, 2809, 2793, 3037, 3228]

7 Conferences on computer arithmetic

[7189, 7199, 7204, 7213, 7216, 7229, 7247, 7248, 7290, 7320, 7328, 7322, 7354]

8 Additional contributions from Nelson H. F. Beebe

[121, 136, 169, 215, 297, 346, 367, 449, 752, 555, 848, 877, 921, 922, 974, 988, 1002, 1007, 1070, 1072, 1099, 1098, 1192, 1163, 1221, 1245, 1264, 1271, 1288, 1388, 1425, 1430, 1459, 1460, 7229, 1714, 1724, 1727, 1741, 1747, 1855, 1861, 1895, 1923, 1979, 2022, 2033, 2061, 2104, 2118, 2126, 2171, 2279, 2280, 2333, 2490, 7302, 2535, 2539, 2552, 2559, 2568, 2609, 2621, 7328, 2744, 2745, 2769, 2773, 2790, 2809, 2862, 2863, 2976, 3056, 3272, 208, 215, 216, 252, 282, 294, 306, 307, 311, 342, 362, 421, 440, 473, 492, 526, 570, 592, 616, 639, 710, 794, 827, 829, 845, 864],[897, 899, 904, 926, 947, 973, 975, 982, 984, 1016, 1063, 1071, 1252, 1283, 1357, 1430, 1437, 1461, 1464, 1559, 1564, 1624, 1638, 1647, 1648, 1703, 1744, 1784, 1788, 1807, 1808, 1813, 1815, 1832, 1843, 1844, 1936, 1968, 2013, 2024, 2098, 2143, 2172, 2188, 2253, 2268, 2283, 2305, 2364, 2375, 2379, 2461, 2485, 2491, 2536, 2583, 2597, 2660, 2670, 2706, 2750, 2801, 2865, 2932, 2938, 2972, 2998, 3006, 3041, 3094, 3102, 3180, 3194, 3197, 3241, 3283, 3330, 7160, 7197, 7205, 7214, 7215, 7240, 7252, 7249, 7295]

Title word cross-reference

#26 [5499].

$((2^n)^m)$ [3802]. $(10^{31}-1)/9$ [1976]. (2^m) [4357, 4378, 4562, 4571, 4476]. (2^n+1) [1081, 4795, 3915]. (2^n-1) [5014]. $(2^n-1, 2^{n+p}, 2^n+1)$ [6293]. $(2^n 2^q 1)$ [6096]. $(2^n \pm 1)$ [5526, 4143]. $(2m)$ [4441]. $(2n+3)$ [6551]. $(2n-(2p\pm 1))$ [4857]. $(a\cdot x)\cdot x?$ [6828]. (d,r) [789]. (M,p,k) [5817]. $(\mathcal{R})$ [2912]. (p) [4357, 4441].

$(x+y)*(x-y)$ [6698]. -2 [743, 183, 206, 949, 801]. $-\infty < n < +\infty$ [141, 160]. 0 [5645]. $0 < N < 1$ [161]. $0 \div 0$ [699]. **$1** [3744]. 1 [4994, 4350, 5159, 5646, 3699, 2167]. $1,000,000$ [618]. $1/\sqrt{x}$ [5788]. $1/t$ [2176]. 10 [530, 6027]. 116 [4025]. 128 [4863]. 15 [530]. 16 [2508, 4191, 4078]. 17×69 [3051]. 2 [1005, 4308, 2049, 5682, 3233, 3997, 618, 6060, 430, 4350, 5015, 3288, 3464, 1760, 3474, 3144, 3481, 5620, 3496, 530, 321, 3686, 3821, 4457, 3699, 5103, 3366, 4947]. $2,576,980,370,000$ [5647]. $22n+1$ [2148]. 256 [4444]. 27 [433]. $2^(n+1)+1\}$ [3974]. $2^{2n+1}-1$ [6042]. $2^{2n+2}-1$ [6042]. 2^{2q} [6032]. 2^8-1 [2860]. 2^k [4489, 5002, 5506, 5043, 5051]. 2^k+1 [866]. 2^{k-1} [4489]. 2^m [4563]. 2^n [1568, 6042, 3974]. 2^n+1 [3974, 4994, 5728, 4467]. $2^{n+1}-1$ [6541]. 2^{n+k} [6541]. $2^n-(2^{n-2}+1)$ [5346]. 2^N-1 [2991, 4830, 6541, 4220, 3974]. 2^q-3 [7044]. $2^q \pm 1$ [6032]. $2^q \pm 3$ [6032]. $2^x p^y \pm 1$ [6260]. 2×2 [5927]. 3 [377, 4996, 4185, 430, 4040, 4209, 4045, 5035, 4880, 321, 6229, 4124, 6625, 4944, 4945]. $3-j$ [298]. 32 [3990, 4444]. 3×3 [2497]. 4 [3974, 4322, 4666, 2525, 2526, 430, 3433, 5733, 5532, 4389, 4722, 2954, 4078, 4080, 2815, 3005, 1932, 3529, 3534]. **$49.95** [3711]. 5 [6032, 4807]. 54×54 [3488]. $6-j$ [298]. 64×64 [2282]. 8 [433, 3446, 4078, 3496]. 84 [307]. **$85.00** [4148, 4149]. 88062 [530]. $8k$ [6865]. 8×8 [5103]. $9-j$ [298]. $<$ [6237]. $>$ [6237]. $[0,1]$ [5159]. ^{0} [4363]. ^{2} [5746]. ^{4} [2800]. ^{5} [3902]. ^{e} [1159]. th [1159]. ^{TM} [4633]. $A(N+C)$ [1910]. $a+b$ [3643]. $a+b+c$ [6321]. $AB+CAB+C$ [6978]. $ab+cd$ [6111]. $ab+cd+e$ [7132]. $a\cdot(x\cdot x)$ [6828]. $A\cdot T$ [4071]. $\arctan Z$ [143]. $a\times b+c\times d$ [6321]. β [6352, 7089]. $C+AB^2$ [4287]. $c/\sqrt{(a^2+b^2)}$ [6302]. $\mathrm{CLP}(R)$ [2932]. $\cos^{-1}$ [3132]. $\cos N$ [180]. $\cos x$ [373]. $\cot^{-1} x$ [373]. d [4700, 5509, 3808]. Δ_2^0 [4948]. e [459]. e^n [141]. e^x [409]. ϵ [3477]. η_T [5674]. ηT [5251]. $\exp(x)$ [1361]. $\exp x$ [373]. $f(x)=0$ [1222]. G_α [809]. $\mathrm{GF}(2)[x]$ [5873]. $GF(2^m)$ [4411, 4779, 4394, 6061, 4981, 5437, 4912, 5877]. $\mathrm{GF}(2n)$ [4206]. $GF(p^m)$ [4658]. H [5176]. I^2L [3242]. ∞/∞ [5022]. K [5445, 4308, 5929, 2108, 6015, 6352, 5971]. $k<m$ [6352]. L [4350]. L^2 [5259]. L^∞ [5258, 7008]. l_2 [6071]. $\ln(x)$ [1529]. $\ln x$ [373]. $\log n$ [1228]. $\log Z$ [143]. LU [6817, 6573]. M [4844, 180, 4138, 2630, 2635, 2644, 2922, 5340, 581, 6352]. $M^E \bmod N$ [2780]. $\mathbf{F}_2[X]$ [7088]. $\mathbf{f}_{2^m}$ [4236]. $\mathbf{F}_{5^{5n}}$ [5692]. $\mathbf{F}_{7^{7n}}$ [5692]. $\mathbf{R}^n$ [6930]. $\mathbf{Z}^2$ [4066, 5042]. $\mathrm{GF}(2)$ [5314, 1692]. $\mathrm{GF}(2^4)^2$ [6175]. $\mathrm{GF}(2^{4\mathrm{n}})$ [3926]. $\mathrm{GF}(2^8)$ [6175]. $\mathrm{GF}(2^{\mathrm{k}})$ [4969, 3773, 4927]. $\mathrm{GF}(2^{\mathrm{m}})$ [5489, 4679, 4987, 3878, 4533, 5148, 3586, 4539, 3889, 5518, 2900, 2901, 3757, 4867, 5314, 5177, 4721, 4392, 5039, 2432, 5438, 4611, 4752, 4913, 5442, 3202, 4287, 4942, 4778, 2312]. $\mathrm{GF}(2^{\mathrm{n}})$ [5001]. $\mathrm{GF}(\mathrm{p})$ [2081]. $\mathrm{GF}(\mathrm{p}^{\mathrm{m}})$ [3492]. $\mathrm{GF}(\mathrm{p}_{\mathrm{k}})$ [4654]. $\mathrm{GF}(\mathrm{q}^{\mathrm{n}})$ [4702]. MECIPTI [282]. μ [1426, 4873, 4915, 2313]. μP [1610, 2008]. N [3969, 808, 2337, 2338, 160, 161, 180, 4582, 5075, 4933, 5971, 5694, 4166, 6071, 1294, 3627]. $n^{\text{ième}}$ [1159]. $N_0' = -N_0^{-1} \bmod W$ [4264]. $N \geq 32$ [5862]. $n\log(n)$ [6489]. $n \times n$ [3143]. $O(1)$ [6389]. $O(n)$ [1195, 3436, 1547]. $O(n^2)$ [2781, 2782]. $O(n\log n)$ [6538, 6689]. Ω [4929]. Arccos$x$ [207]. Arcsin$x$ [207]. Arctan$x$ [207]. mod$p$ [1915]. P [6529, 4643, 2059, 1130, 894, 1044, 1635, 7089, 4280, 4629, 3354]. p^k [6706]. π [1630, 2237, 2238, 4608, 268, 5647, 1693, 459]. $p \times p$ [4587, 4731]. q [5790]. $q*m-n$ [1628]. QR [6136]. R [3607, 3065, 1605, 1613, 6432, 5862]. $r=m^k$ [1438]. r^a [4952]. r^b-1 [4952]. r^c+1 [4952]. $\{r^n-2, r^n-1, r^n\}$ [5305].

$r \geq 8$ [5862]. s [4884]. sin(**BIG**) [5240]. $\sin^{-1}$ [3132]. $\sin N$ [180]. $\sin x$ [373]. $\sqrt{(a^2+b^2)}$ [6302]. $\sqrt{(x)}$ [1481]. $\sqrt{(x/d)}$ [3850]. $\sqrt{2}$ [7012]. $\sqrt{x}$ [1307, 451]. $\sqrt{x^2+y^2}$ [5682]. T [6589]. $\tan^{-1} x$ [373]. $\theta(\log N)$ [2358]. $\times$ [4071, 3920, 4137]. w [4739]. X [1542, 2897]. x^2+ny^2 [3711]. x^n [5995, 3312]. $x \star (1/x) \neq 1$ [3250]. y [4420]. Z [5337].

-2 [1004]. **-adic** [1130, 1044, 1635, 2059, 894]. **-Approximations** [7008, 5258, 5259]. **-ary** [2922, 4138]. **-b** [3488]. **-Bit** [3990, 6865, 307, 5971, 5075]. **-body** [4582, 4933]. **-circulant** [6432]. **-Coordinate** [4420]. **-count** [6589]. **-D** [5682, 4185, 4209, 3288, 6229, 4124, 5103, 3366, 2167]. **-Depth** [3436]. **-Digit** [433]. **-Dimensional** [5509, 2049, 4700]. **-Fold** [5445]. **-Friendly** [5817]. **-function** [5176]. **-gram** [5694]. **-Matrix** [4844]. **-Moduli** [6032, 3974, 4666, 4807]. **-Norms** [6071]. **-Order** [3607]. **-Partition** [6015]. **-Real** [4948]. **-select** [4166]. **-sets** [3065]. **-spaces** [4884]. **-th** [5929, 3808, 5790, 2338]. **-transform** [5337]. **-Vectors** [6071].

.NET [6442, 5078].

/m [4873]. **/spl** [4873].

0.18-CMOS [5784]. **0.4.1rc** [6443]. **0.80pJ** [6577]. **0.80pJ/flop** [6577]. **'00** [7430, 7435, 2544]. **'01** [7444]. **'03** [7473]. **'04** [7482, 7490]. **'07** [7525, 7531, 7533, 7538]. **'08** [7542, 3036, 5385].

1 [217, 3552, 6663, 3417, 2880, 228, 63, 65, 67, 563, 3280, 6696, 4071, 4414, 1163, 5784, 7094, 1933, 3870]. **1-GHz** [6663, 4414, 5784]. **1-Output** [5351]. **1.0** [3871]. **1.24Tflop** [6577]. **1.24Tflop/sW** [6577]. **1.5** [5662]. **10** [5746]. **10-kA** [5746]. **10-kA/cm** [5746]. **10/20** [958]. **100** [2893, 2894]. **100-MFLOPS** [2893, 2894]. **1014** [6772]. **1057** [1981]. **10858** [1746]. **10967** [4368, 5165]. **10967-1** [3280]. **10967-2** [4368]. **10967-3** [5165]. **10th** [7240, 7574, 7322, 7451, 7464, 27, 7221, 2767]. **'11** [7569, 1110, 1391, 1507, 1408, 1312]. **11-bit** [4915]. **11/780** [2036, 1569, 1570, 1803, 1019]. **116** [270]. **1164/WTL** [2033]. **11i** [4930]. **11th** [7442, 7335, 7353, 7354, 3187]. **120B** [1120]. **128-bit** [6343, 4122]. **12th** [7485, 7551, 7196, 7377, 3459, 7537]. **13** [4327, 2090]. **132-Bit** [342]. **13th** [7470, 7212, 7396, 7366, 7524, 3849, 3777, 7594]. **14-Port** [3920]. **14th** [7357, 7441, 7472, 7523, 7435, 7421]. **15** [2770]. **15-b** [4459]. **15-bit** [4127]. **15C** [1629]. **15th** [7260, 7531, 7196, 7539, 7443, 7489]. **16-19** [7160]. **16-b** [6478]. **16-Bit** [4538, 6704, 6720, 7104, 6865, 3027, 1260, 1601, 4999, 3080, 1759, 6342, 1476]. **16-bit-** [1610]. **16-bit-Multiplikation** [1476]. **16-by-8-bit** [1645]. **16-Digit** [5371]. **160-ns** [2839]. **160-Word** [3920]. **1620** [255]. **164** [1815]. **167** [3496, 3534]. **16BST** [1817, 1733, 1734, 1736, 1740, 1750, 1763, 1772, 1689]. **16F/400** [917]. **16th** [7514, 7505, 4655, 7469, 7511]. **17** [287, 838]. **17-Bit** [648, 647]. **1788** [6565]. **1788-2015** [6085]. **17th** [7576, 7516, 7432, 7506, 7509].

'18 [7587, 562]. **18-21** [7522]. **18.Mai** [1484]. **18th** [7541, 7530, 7536, 5479]. **18th-Century** [5479]. **1945** [61]. **1947** [7152]. **196** [5690, 5701]. **1962** [7160]. **1965** [7164, 7166]. **1967** [7171, 7173]. **1968** [7176]. **1969** [7174, 7175, 587]. **1971** [7186]. **1972** [7184, 4052]. **1973** [4129, 4130]. **1975** [7193]. **1976** [7194, 7196]. **1977** [7197, 7222, 1652]. **1979** [7202, 7205]. **1980** [7206, 7212, 1525, 7217, 7214]. **1981** [7219, 7224]. **1983** [7240]. **1984** [7249]. **1985** [7266]. **1987** [2087]. **1988** [7269, 7280]. **1989** [7293, 2583]. **1989-01** [2389]. **1989/Taipei** [7293]. **1991** [2639, 7315, 2767]. **1992** [2859, 7378]. **1993** [7346, 7389, 3187]. **1994** [7367]. **1994-12** [3280]. **1995** [7368, 7380, 3459]. **1998** [7406, 7408, 3897]. **1998-12** [3896]. **1999** [7418, 7419, 7424, 7426]. **19th** [7549, 7519]. **1st** [7403].

2 [2178, 6490, 2521, 1734, 64, 66, 68, 4368, 4041, 4580, 6450, 3923, 4898, 528, 2014, 7095, 3518, 4122, 4771, 2825, 3017]. **2-D** [3518]. **2-Digit** [4179]. **2-dimensional** [2992]. **2.0** [3623]. **2.44** [4040, 4209]. **20** [2669, 2403]. **20-MFLOPS** [2404, 2403]. **200-ns** [1485]. **'2000** [7429, 7428, 7429, 7435]. **2001** [7440, 7441, 7443, 4832, 7445, 7451, 7452]. **2002** [7454, 7455, 7457, 7458, 7459, 7466]. **2003** [7469, 7470, 7473, 7474]. **2004** [7481, 7482, 7484, 7490, 7491, 4890]. **2005** [7498, 7499, 7501, 7504, 7510]. **2006** [7513, 7514, 7517, 7521]. **2006Petrozavodsk** [7571]. **2007** [7525, 7527, 7528, 7530, 7533, 7535, 7545, 7540]. **2008** [7541, 7542, 5491, 7544, 6550, 5935, 5936, 6715, 5543, 5767, 5565]. **2009** [7547, 7551, 7554, 7555, 5524]. **2010** [7564, 7565, 7567]. **2011** [7570]. **2013** [7575]. **2015** [7578, 7579]. **2016** [7583]. **2017** [7584]. **2018** [6463]. **2019** [6516, 7589, 7590]. **2020** [6645, 6643, 6644, 6646, 6647, 6649, 6670, 7591, 6695]. **2020s** [6757]. **2021** [6757, 6758, 6759, 6760, 6768, 7595, 6814, 6832]. **2022** [6870, 6871, 6872, 7597, 6899, 6900]. **2023** [7599]. **20th** [7553, 7593, 7572, 7534]. **21-23** [7551]. **2100** [2562]. **21064** [3346]. **210uW** [6413]. **210uW/MHz** [6413]. **21164** [3391]. **21st** [7559, 7487, 7431, 7575, 7548]. **22** [337]. **22-nm** [6663]. **22nd** [7579]. **22nm** [6577]. **23-28** [7518]. **23nd** [7583]. **23rd** [7305, 7562, 7565]. **24** [1127]. **24-26** [7471]. **24-bit** [2368]. **24.und** [7222]. **24732** [5167]. **248GOPS** [6845]. **248GOPS/W** [6845]. **24b** [2465]. **24th** [7584, 7404, 7407, 7461, 7567, 7222]. **25-28** [7430]. **256** [6299]. **25th** [7301, 7417, 7222, 7532, 7588]. **26-28** [7482]. **26th** [7567, 7590]. **27th** [7591, 7564]. **281** [3059]. **286** [3642]. **28nm** [6845]. **28th** [7595, 7412]. **29.95** [3711]. **29th** [7420, 7597]. **2B** [645]. **2DFFT** [1883]. **2nd** [7563, 4584, 7185]. **2Sum** [6151, 6259].

3 [3097, 5165, 6426, 2773, 6125]. **3-ps** [5784]. **30-bit** [2425]. **30-MFLOP** [2249]. **30-ns** [3474]. **300** [4209, 1229]. **300-MHz** [4209]. **300MHz** [4040]. **30th** [7599]. **312** [432]. **3171** [2503]. **31st** [7274]. **32** [5121, 2061]. **32-** [6939]. **32-Bit** [3719, 2316, 2185, 2329, 5483, 4810, 3417, 1403, 5011, 1623, 2738, 2410, 2411, 2412, 2413, 2561, 1996, 2435, 3314, 2573, 3191, 3956, 2488, 3206]. **320** [3100]. **320-MFLOPS** [3101, 3100]. **320C25** [3292]. **32b** [2249]. **33** [2215]. **33rd** [7385, 7436, 7329]. **34** [512]. **34-MFLOP** [2488]. **360**

[417, 418, 504, 383, 391, 392, 681, 439, 480, 1441, 6459, 537]. **3600** [302]. **36th** [7349]. **370** [1945, 2036, 2482]. **37th** [7535]. **390** [4082, 3816, 3817, 4108, 4109]. **39th** [7525, 7542]. **3CT** [3386]. **3DNow** [3923, 4041]. **3DTV** [5773]. **3m** [6367]. **3rd** [7401, 7189, 7507]. **3X** [5443].

4 [3396, 4796]. **4-2** [1167]. **4-bit** [6736]. **4-Input** [5351]. **4-Input/1-Output** [5351]. **4.4ns** [3488]. **40** [2412]. **40-MFLOPS** [2410, 2412]. **40-ns** [648]. **400** [917]. **4000** [497]. **400MHz** [3920]. **400th** [7378]. **4096-Core** [6859, 6744]. **40ns** [647]. **41** [443]. **432** [1856]. **44th** [7521]. **45th** [3764]. **48th** [7504]. **4d** [4677]. **4m** [6367]. **4th** [7199, 7430, 7324, 7452, 7598].

5 [3544, 4151, 6959]. **50** [2327]. **50-Megacycle** [149]. **50-MHz** [2327]. **501** [3781, 3633]. **50th** [7361]. **512** [6375, 7020]. **512-bit** [6885]. **528** [1118, 4023]. **53*53** [3266]. **53nd** [7560]. **54** [338]. **54-b** [2839]. **55-b** [3474]. **5th** [7468, 7550, 7216, 7519, 7375].

6.7-MFLOPS [2446, 2448]. **60** [605, 578, 410]. **600** [3989]. **600-MHz** [3989]. **6000** [3386, 2539, 636, 2564, 2568, 1242, 3368, 717]. **6000/7000** [1036, 1242]. **600MHz** [4082]. **601** [3346]. **603e** [3616]. **60M** [2638]. **60M-flops** [2638]. **64** [4784, 3996, 4171, 4031, 4197, 4198, 6536, 4243, 4118]. **64-active-instruction** [3530]. **64-b** [3642, 2961, 3530]. **64-Bit** [2436, 3920, 7084, 2324, 2327, 5392, 5134, 4993, 3073, 3434, 5159, 2715, 3448, 2403, 2404, 2549, 2408, 2928, 6939, 2772, 2263, 3328, 4931, 2033]. **64-bit-Universal-Floating-Point-ISA-Compute-Engine** [6536]. **6400** [1694]. **64b** [2326]. **65** [624]. **65-nm** [7084]. **65/6600** [624]. **650** [2089]. **651** [2048]. **65nm** [6413]. **6600** [731, 554, 624, 591, 1345]. **6600/7600** [731]. **665** [2203]. **68000** [1884]. **68000-Einplatinenrechner** [2080]. **693** [2809]. **6th** [7515, 4840, 7480, 7229, 7419, 7534, 7397, 7510, 7484].

7-9 [7553]. **70** [5686]. **7000** [1242]. **7094** [397, 472]. **7094-II** [472]. **70th** [5600]. **714** [3056]. **715** [3058, 3670]. **719** [3037]. **722** [3057]. **7289** [7012]. **73** [1029]. **754** [3843, 5574, 2861, 4310, 3399, 6047, 3980, 4516, 5491, 6516, 6898, 3871, 4332, 6791, 4829, 6797, 6798, 1409, 6547, 6811, 6183, 1861, 6550, 2093, 3454, 3619, 5600, 5943, 5328, 4238, 5050, 5186, 6935, 6586, 7077, 7078, 2275, 6463, 6349, 7089, 1679, 4758, 3941, 5640, 2016, 1458, 6737, 7145, 3355, 5565, 5795, 7112]. **754-1985** [1860, 1861]. **754-2008** [5428, 5491, 6550, 5565]. **754-2019** [6549, 6516]. **754-Posit** [6935]. **754r** [5419, 5124, 5137, 5269, 5492, 5170, 5223, 5169, 5182, 5371]. **7600** [731]. **77** [1190, 4023, 1331]. **780** [2036, 1569, 1570, 1803]. **786** [3945]. **'79** [7202, 7205]. **7th** [7206, 7208, 7513, 7247, 7277, 7518].

8 [1295]. **8-Bit** [3810, 6857, 6991, 1967, 7042, 7066, 6945, 7083, 6474]. **8-to-64** [6577]. **80** [1483]. **80*87** [3018]. **80-bit** [1928]. **80-FLOPS** [2961]. **8000** [3448]. **80287** [1903]. **8080/8085** [1583, 1133, 1219]. **8080A** [1487].

8085A [2390]. **8086/80286** [1935]. **8087** [1629, 1315, 1903]. **8087/80287** [1935, 1903]. **8087/80287/80387** [2293]. **8088/8087** [1733]. **80960** [2245]. **80960KB** [2246]. **80b** [2447]. **80h** [1295]. **80's** [7211]. **814** [4447]. **8231A** [4147]. **826** [6413]. **'83** [7232]. **83S87** [2516]. **'84** [7241]. **842** [5004]. **'85** [7246, 480]. **854** [3406, 3407, 2087, 3478]. **854-1987** [2039, 2087]. **'86** [7253, 7254]. **86**^{TM} [3919]. **871** [5448]. **'88** [7275, 7276, 7279, 2309]. **881** [5507]. **'89** [7287, 7294]. **89/TI** [4460, 4461]. **8s** [765]. **8th** [7299, 7499, 7408, 7261, 5629].

9 [516, 695]. **9-11** [7527]. **9.4** [6845]. **'90** [7297, 7306, 7321, 4303, 3390, 4964, 4965, 2679, 3486, 4447, 3835]. **908** [5658]. **90nm** [4796]. **'91** [7318, 7321, 416, 395]. **'92** [7327, 7330, 7333, 7341, 4460, 4461]. **'93** [7344]. **'94** [7356, 7357, 7366]. **'95** [7373, 3848, 4443, 4755]. **954** [6063]. **'96** [7387, 7391]. **96-bit** [2259]. **97** [3712]. **'98** [7404, 7412, 3966, 7402]. **980A** [1015]. **'99** [7417, 7418, 7419]. **9th** [7290, 7565, 7522, 7224, 2360].

= [2803, 2804, 3348, 7186].

A-Priori [2101]. **A.K** [4672]. **a.k.a** [5538]. **A/D** [3887, 905, 3348, 4127, 4459, 801]. **A/D-konverter** [3348]. **A1** [1098, 1192]. **Aarhus** [7229, 7229]. **Abacus** [202, 1026, 5542]. **Abbreviating** [7]. **abc}** [4814]. **ABE** [546]. **ABI** [6866]. **Abnormal** [6753, 6036]. **Abotec** [3181]. **Absolute** [3393, 3394, 2763, 2253, 432]. **Abstract** [5582, 4544, 5616, 525, 5334, 5857, 6362, 4841, 2912, 2112, 5858, 4893, 4905, 2986]. **abstraction** [5478, 5835, 1329]. **abstraction-based** [5478]. **Abstracts** [7345, 7436]. **Abu** [407]. **Acadiana** [7408]. **ACBAM** [6957]. **ACBAM-Accuracy-Configurable** [6957]. **Accelerate** [6597, 6292, 4582]. **Accelerated** [6796, 5017, 5490, 5698, 6445, 6979, 7103]. **Accelerating** [5468, 6041, 4802, 3866, 5708, 6909, 6795, 6174, 7037, 7060, 4237, 6712, 6333, 4729, 6338, 5776]. **Acceleration** [6685, 6817, 6199, 6810, 6435]. **Accelerator** [6043, 6769, 6496, 5690, 5702, 7019, 5727, 7040, 6310, 6925, 6329, 2254, 6450, 6716, 7076, 6017, 6954, 4913, 7102, 6972, 6623, 6390, 2267, 7092]. **Accelerators** [6913, 7028, 6559, 7047, 6822, 7068, 6454, 7110, 4774, 6983, 5281, 3502]. **Acceptance** [3486]. **Access** [2144, 5112, 3399, 4585, 4639, 6979]. **Accessibility** [7497]. **Accessible** [6908]. **Account** [3]. **Accumulate** [6511, 4988, 6412, 6813, 6431, 6722, 6962, 5965, 3824, 6636, 6747, 4508, 6576, 3671]. **Accumulated** [1367, 574, 976]. **Accumulation** [6263, 2055, 1958, 179, 5931, 6190, 5310, 6091, 5549, 4430, 77, 453, 1071, 3706, 5815, 3732, 3757, 5753, 573, 5546, 2766, 95, 5451]. **accumulations** [4237]. **Accumulator** [3860, 4767, 6236, 379, 2696, 1031, 3314, 5785, 5872, 4769]. **Accumulators** [6504, 6331, 370, 1072]. **accuracies** [2603]. **Accuracy** [4647, 217, 6240, 6996, 6880, 1714, 5473, 860, 1014, 4800, 5392, 6780, 6781, 2677, 5902, 6053, 3239, 5909, 6162, 5277, 5145, 6169, 1840, 227, 228, 7126, 433, 389, 1289, 1851, 3609, 4553, 4365, 2381, 6422, 1745, 1980, 2543, 1620, 7043, 1983, 5926, 6306, 1627, 2401, 7048, 3118, 752, 5180, 6710, 831, 5185, 3792, 6957, 5782, 3164, 6225, 165, 6962, 1684, 2020, 2021, 6737, 410, 3526, 6855, 6974, 493, 6748, 6749, 5383, 6985, 5884, 5669,

5814, 1812, 4661, 5900, 6272, 6788, 6058, 6916, 3756, 3094, 1744, 6698, 2547, 2098, 1993, 5179, 5846, 5181, 6444, 3785, 1755, 5343, 6118, 7085]. **accuracy** [1678, 107, 2461, 1688, 1921, 1784, 6360, 2300, 3194, 6473, 3840, 544, 5117, 2051, 1210, 3647, 650, 1352, 2571]. **accuracy-adjustable** [7085]. **accuracy-guaranteed** [5343]. **Accurate** [5576, 5121, 1804, 2649, 2652, 2868, 7123, 1384, 4342, 4528, 4529, 4530, 4682, 4824, 4825, 3737, 4346, 5989, 6164, 6277, 4008, 5282, 2694, 6063, 4697, 4837, 4839, 5288, 2701, 5407, 5514, 5520, 4362, 6548, 6084, 5925, 5599, 5745, 5929, 5930, 3285, 5931, 6190, 230, 2551, 2240, 6926, 6569, 3299, 904, 570, 3469, 639, 5765, 6585, 7250, 4896, 4897, 5068, 6018, 2977, 1535, 5076, 5444, 5445, 5446, 5552, 5630, 5957, 5958, 3679, 3813, 3815, 4924, 5092, 4117, 2609, 6026, 6852, 3020, 597, 5972, 4488, 1794, 5804, 3049, 5255, 3240, 3420, 4683, 4176, 2365, 5513, 6284, 4203, 5924, 1867, 5927, 2734, 3122, 757]. **accurate** [758, 2952, 4736, 2960, 4738, 6116, 4252, 2147, 4451, 5218, 3007, 2841, 5461, 5237, 1094]. **Accurately** [3560, 6509, 2513, 5743, 5036, 2605, 4923, 6510, 6267, 4811, 4812, 5613, 5637]. **ACE** [945, 5109]. **achieved** [3024]. **Achieving** [6035, 5392, 5688, 6280, 1840, 4742, 5865]. **ACL2** [7454, 4269]. **ACL2-2002** [7454]. **ACM** [7269, 7356, 7481, 7482, 7497, 7498, 7512, 7525, 7541, 7542, 7517, 7444, 7460, 2090, 7466, 7483, 2347, 7374, 7321]. **ACM/IEEE** [7512]. **ACM/SIGDA** [7481, 7498]. **ACM/SIGPLAN** [7483]. **Acoustics** [7253, 7319, 7473, 7490]. **Acousto** [1906]. **Acousto-Optic** [1906]. **acquisition** [2502, 2669]. **ACRITH** [1980, 1812, 2543, 1983, 1869, 2103]. **ACRITH-XSC** [2543]. **across** [5328]. **ACSSC** [7545]. **ACT8837** [2339]. **ACTION** [6928]. **Activation** [6669]. **Activations** [6314]. **active** [5773, 3530]. **Activity** [5882]. **Actual** [5321, 6500]. **acyclic** [3209]. **Ada** [7356, 7299, 7335, 1872, 7356, 2322, 2645, 2646, 2870, 2871, 3229, 2506, 2662, 3423, 2353, 2073, 6065, 2527, 7335, 1525, 1749, 2104, 1756, 3639, 2768, 2139, 2812, 1701, 2840, 1483]. **Ada-Europe** [7335]. **Ada83** [3040]. **adaptable** [4334]. **Adaptation** [2873, 4404, 6840]. **adapted** [5999]. **Adapting** [2932, 4023]. **Adaptive** [5827, 6554, 4224, 3113, 1633, 2922, 6709, 6820, 6206, 2449, 1769, 3684, 3685, 3818, 1462, 1549, 6972, 2175, 1947, 1582, 1720, 4809, 4980, 6418, 5160, 2393, 3779, 3911, 1755, 2429, 6106, 2963, 3148, 5781, 3696, 5648]. **ADC** [4358, 2454, 4137, 4951]. **ADCOM** [7531]. **Add** [6493, 5476, 3051, 4664, 4978, 6263, 4325, 5488, 7018, 6165, 5156, 2540, 6692, 5306, 3449, 6428, 3898, 4386, 5324, 5325, 5326, 3124, 5762, 5550, 5627, 5435, 5436, 5075, 6958, 4759, 7105, 6229, 6371, 6635, 6519, 4489, 2331, 4804, 5685, 3055, 3584, 5009, 4029, 5016, 6179, 4558, 5020, 4572, 4874, 4070, 6006, 5053, 4738, 3152, 5636, 4766, 4938, 1704, 4641, 4781]. **add/sub** [3584]. **Addendum** [1230, 762]. **Adder** [6042, 3719, 3972, 4309, 4810, 5487, 4984, 1102, 5271, 2889, 335, 6912, 1124, 5739, 6426, 5746, 753, 3787, 6590, 5950, 6016, 3796, 3660, 6591, 5346, 5347, 4429, 4269, 4919, 5640, 6966, 533, 589, 936, 5367, 5565, 6854, 6471, 6370, 5374, 5568, 133, 5236, 5381, 802, 2185, 4979, 2678, 5985, 3063, 2886, 3257, 5722, 4552, 2904, 3109, 3110, 3111, 3112, 1428, 2751, 5945, 2112, 4882, 5767, 2957, 4250, 2795, 6959, 1167, 5785, 5872, 4621, 5449, 4931, 2482, 5796]. **Adder-Based** [6042, 3109, 3110, 3111, 3112]. **Adder/Subtractor** [5739, 6426, 6854,

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[578, 734, 757, 578, 491, 539, 272, 410]. **algorism** [4678, 1026]. **Algorithm** [1708, 5242, 1709, 1260, 3965, 4960, 6488, 3039, 3222, 3717, 3854, 1806, 3042, 725, 6880, 5251, 1372, 807, 1492, 2048, 5477, 6384, 6656, 6498, 6772, 1098, 1814, 3403, 4977, 3562, 1497, 5691, 3727, 814, 5695, 1820, 2202, 5268, 3988, 2343, 2059, 1017, 1825, 2873, 5142, 2351, 1831, 3072, 4008, 5709, 6410, 1115, 1835, 428, 4019, 4839, 6172, 5515, 3436, 4854, 3606, 3759, 4035, 4554, 4037, 4207, 4208, 6546, 2385, 2720, 1617, 5018, 5731, 5733, 740, 3452, 972, 5528, 2090, 5747, 1630, 1873, 5314, 3293, 2739, 828, 6925, 5937, 6094, 3462, 313, 5319, 5320, 4066, 2425, 5043, 1048, 5612]. **Algorithm** [2106, 569, 2108, 262, 640, 4732, 2114, 6936, 762, 2951, 1649, 1890, 2116, 2258, 5340, 2570, 6208, 6453, 1654, 1897, 4418, 2778, 2964, 4420, 1532, 1661, 2781, 2782, 3665, 6017, 7141, 4904, 5434, 5775, 1157, 2593, 6123, 4910, 923, 2141, 924, 7091, 775, 4617, 1243, 2015, 5641, 6025, 372, 3820, 4119, 3188, 4124, 4455, 5095, 1693, 6230, 456, 4463, 2826, 3523, 2157, 489, 5564, 5790, 5876, 5967, 595, 3703, 1478, 244, 3210, 3536, 5114, 4286, 2634, 1710, 603, 2175, 2040, 4789, 6489, 3554, 3855, 5247, 6383, 3404, 1582, 1720, 4809, 2665, 2666, 3408, 5135, 3233, 2673, 2511, 3986, 3572]. **algorithm** [3417, 5700, 3731, 3420, 3242, 4339, 4340, 3875, 3876, 6277, 3583, 3074, 465, 4689, 4691, 5000, 4014, 3584, 1204, 5293, 4843, 2217, 5833, 5715, 6284, 1971, 3889, 4201, 3262, 3441, 3442, 4206, 2903, 514, 515, 2719, 4038, 3894, 5927, 4715, 5025, 2402, 748, 5749, 2736, 2737, 5173, 2554, 2740, 6708, 5847, 4573, 3464, 4576, 4577, 3632, 3783, 5046, 2941, 2250, 5853, 573, 4886, 761, 577, 1762, 2952, 4889, 5055, 1891, 983, 5425, 6011, 3310, 6345, 2780, 5862, 3149, 5548, 2783, 2971, 1907, 2972, 2452, 4747, 5433, 2133, 2587, 4608, 4753, 4914, 997, 1064, 3341, 3180, 3689, 3518, 1922, 3519, 2606, 293]. **algorithm** [1927, 2815, 3005, 5096, 4770, 5455, 5456, 4283, 3194, 6473, 659, 2487, 3203, 3366, 4777, 5461, 5111, 6031, 3376, 7147, 4949, 6673, 3037, 3555, 2048, 6772, 1192, 2203, 3056, 3057, 3058, 3059, 384, 6063, 1118, 1205, 5004, 5507, 432, 4023, 512, 6417, 564, 2089, 3670, 5448, 270, 2809, 3945, 4447, 5658, 6819]. **algorithm-based** [2250, 3518, 3203, 3366, 3376]. **Algorithmen** [2397, 2233, 2571, 1699, 2304]. **Algorithmes** [4681, 5329, 4348, 2760]. **Algorithmic** [5828, 7518, 3902, 252, 3661, 2800]. **Algorithmics** [7075, 4486, 5091]. **Algorithmique** [5091, 4486]. **Algorithms** [850, 2037, 6642, 4148, 4149, 722, 1805, 3853, 855, 665, 1011, 6879, 7499, 3227, 5388, 5678, 6259, 1265, 1375, 5394, 5396, 1584, 275, 3059, 6268, 3868, 4675, 1105, 5821, 2878, 4526, 4527, 4681, 3247, 4528, 3733, 6060, 1022, 1023, 1024, 1112, 6910, 5405, 3076, 4013, 4180, 6525, 5148, 2071, 2363, 6797, 6798, 5506, 3078, 467, 3743, 736, 823, 877, 6681, 1517, 6070, 5513, 883, 4197, 5158, 2538, 7543, 4205, 4364, 3609, 4553, 3610, 3893, 1519, 1412, 1521, 3278, 4212, 4712, 4713, 3102, 3103, 5738, 2545, 3104, 6189, 6701, 2397, 2233, 4221, 827, 521, 1420, 3904, 7566, 522, 6706, 3115]. **Algorithms** [4564, 3294, 4383, 630, 5845, 5321, 2934, 1528, 4067, 3124, 2937, 3300, 7388, 7508, 1049, 6827, 3641, 1639, 1887, 686, 1640, 690, 1641, 4885, 7266, 7280, 4405, 5052, 4589, 3304, 447, 356, 476, 6716, 360, 3648, 5056, 4411, 2571, 3795, 7071, 4415, 1322, 3798, 3320, 1440, 3802, 1443, 4256, 1444, 1770, 6018, 2793, 3807, 7337, 6020, 6841, 5957, 5958, 7325, 6961, 4615, 774, 2460,

3507, 5352, 925, 7094, 7095, 711, 3687, 373, 4118, 1341, 2607, 2816, 2817, 5788, 5875, 3009, 939, 2828, 3833, 1699, 2304, 5567, 3364, 1473, 3372, 7146, 5113, 5382, 7148, 551, 3213, 1083, 3553, 5468, 5977]. **algorithms** [4503, 4971, 4315, 5131, 6151, 6257, 6774, 6883, 7288, 2668, 2201, 221, 3864, 1960, 419, 3995, 1827, 1199, 2685, 3064, 3421, 4824, 2207, 1836, 3251, 4688, 6914, 3430, 225, 5150, 5153, 6073, 6414, 7315, 4029, 4708, 5725, 6918, 1299, 3274, 5308, 1982, 741, 2922, 4385, 2415, 3120, 4578, 1754, 2426, 3785, 830, 1755, 1882, 1637, 5614, 7422, 7433, 7449, 7462, 7476, 7493, 4072, 2565, 4734, 3135, 2760, 5054, 5189, 2437, 2569, 5191, 5426, 6455, 4083, 5863, 4085, 1442, 1663, 5625, 6215, 2270, 4905, 2456, 4608, 2595, 4095, 3934, 4616, 3170, 3171, 3509, 5354, 2466, 1784, 2023, 5218, 4768, 3004]. **algorithms** [1073, 2827, 3195, 492, 1703, 4942, 5380, 3022, 4950, 2349, 2046, 7266, 7280, 357, 2006, 1061, 1537, 4672]. **Algorithmus** [2046, 384, 2006, 1537]. **Alignment** [5952, 3857, 3921]. **alignments** [1920]. **all-one** [4981]. **Allerton** [7172]. **Alley** [3606]. **allgemeine** [1094, 1210]. **allgemeiner** [1352]. **Allocatable** [3475, 3486]. **Allocation** [6619, 4545, 5749, 4591, 4593, 4464, 3356]. **Alloy** [5856, 6008]. **Almost** [7156, 2283, 5046]. **Alpha** [2989, 3391, 2881, 3512, 3346]. **alphabetical** [101]. **Alps** [6820]. **also** [2965]. **Alternanten** [767]. **Alternate** [4423]. **alternating** [3638]. **Alternative** [1279, 6684, 6562, 6937, 6389, 961, 574, 6349, 4639]. **Alternatives** [4306, 1142, 6446, 3133, 4602, 4718]. **Alto** [7405, 7391]. **ALU** [4300, 5467, 5667, 6413, 2096, 1902, 1659, 5786, 2033, 1798, 2848]. **ALUs** [2168]. **always** [6140]. **am** [1652, 7222, 2613]. **Am25S05** [620]. **Am29000** [2267]. **Am29027** [2267]. **Am29050** [2574]. **Am29C327** [2318]. **Am9511A** [1380]. **Am9511A/Am9512** [1380]. **Am9512** [1270, 1380]. **ambiguity** [4953]. **AMD** [6867, 6528, 4041, 3923, 4083, 3933, 3934, 4097, 4269]. **AMD-K7**^{TM} [4083, 3934]. **AMD5** [3919]. **ameliorating** [1037]. **amélioration** [4315]. **America** [23]. **American** [2039, 7225, 7160, 2859, 31]. **Amherst** [7588]. **Amidst** [6804]. **Among** [1221, 4078]. **amount** [4027]. **Amounts** [3739, 3881, 4009]. **amplifier** [2222]. **Amplifiers** [184]. **Amplifying** [1718]. **Amsterdam** [7528, 7593]. **AN-Codes** [4350]. **AN/UYK** [838]. **AN/UYK-17** [838]. **Anaheim** [7257, 7285, 7313]. **Analog** [462, 111, 4192, 3598, 139, 140, 230, 113, 232, 443, 369, 4098, 132, 150, 4142, 2892, 4852, 4039, 689, 4915, 1687, 3695, 2313]. **Analog-To-Digital** [4142, 4192, 4852, 3695]. **Analogrechenschaltungen** [547]. **analogue** [547, 1063, 3209]. **analogue-to-digital** [3209]. **Analyse** [5696, 40, 7186]. **Analyses** [4355, 3901, 1466, 2818]. **Analysis** [602, 2171, 7207, 152, 4298, 1803, 5125, 7371, 6655, 6492, 4312, 6493, 6258, 3401, 6658, 171, 5691, 5482, 1584, 2335, 2668, 5695, 1588, 2674, 1385, 1017, 6784, 7345, 6159, 3870, 6672, 7016, 6521, 2355, 6408, 7021, 7125, 818, 4844, 7239, 112, 5717, 4848, 5719, 5834, 2898, 3087, 6542, 6543, 126, 4554, 2222, 7592, 4041, 6694, 396, 3279, 7262, 2913, 6186, 2393, 397, 627, 2728, 2916, 742, 1138, 1045, 399, 6315, 6710, 3781, 831, 5760, 6201, 6572, 6823, 2750, 1147, 6336, 4406, 355, 913, 5056, 6109, 5341, 2769, 1898, 763, 836, 4894, 2966, 1056, 1661, 4088, 987, 1155, 1906]. **Analysis** [4907, 5777, 1536, 2799, 705, 6842, 7090, 5869, 5351, 5782, 2461, 4275, 784, 38, 42, 3683, 931, 2994, 3515,

1070, 1341, 2816, 2817, 7161, 5219, 6737, 6362, 7145, 2826, 3834, 6626, 1474, 7224, 216, 5233, 7524, 7186, 2849, 2850, 7149, 411, 2634, 2172, 5464, 1947, 2040, 3553, 495, 1488, 1089, 1189, 1368, 1807, 2182, 2501, 2183, 4307, 5814, 3722, 1582, 1720, 2666, 3408, 6391, 3054, 40, 422, 1827, 2063, 3065, 6277, 2207, 465, 4691, 5000, 4014, 4695, 505, 3430, 3588, 225, 510, 6066, 5829, 5006, 5153, 2375, 2710, 7240, 3600, 2221, 308, 824, 2079, 1744, 3270, 3271, 5732]. **analysis** [5308, 1982, 5734, 7196, 5927, 3284, 472, 3287, 6089, 628, 3288, 747, 1224, 519, 1225, 1226, 4385, 6438, 3778, 1882, 1637, 524, 571, 2250, 4244, 7065, 1647, 1648, 5542, 5055, 5337, 363, 403, 2444, 2119, 2958, 2959, 835, 3147, 984, 2963, 3148, 3805, 4259, 989, 2268, 2270, 368, 1158, 4432, 2590, 2595, 6220, 5961, 3935, 840, 3175, 3176, 3344, 3510, 1065, 5207, 1546, 3349, 3693, 2295, 1924, 375, 3826, 3827, 4456, 1175, 7295, 2829, 3195, 1251, 715, 794, 3011, 5652, 1703, 3839, 1182, 2628, 3842, 6673, 1816, 7323]. **Analysis-Based** [4907]. **Analytic** [3397, 7193, 7193]. **Analytical** [1723, 5714, 191, 16, 5183, 15, 6207, 6451]. **Analytics** [6422]. **Analyzed** [6704, 692, 693, 694, 760]. **Analyzer** [313]. **analyzers** [2374]. **Analyzing** [2386, 6840]. **Anatomy** [3498]. **Anchored** [6504, 6331]. **Ancient** [5811, 6500, 599]. **Andrews** [7438]. **Angeles** [7153]. **Angewandte** [7215, 7214]. **Angle** [2385]. **Angles** [4216]. **angular** [84]. **ANL** [439]. **Ann** [7216, 7350]. **Anniversary** [7361]. **Annotated** [5679, 1235]. **Announcements** [3848]. **Annual** [7206, 7356, 7368, 7414, 7525, 7542, 7314, 7172, 7208, 7299, 7485, 7527, 2072, 7215, 7273, 7305, 7329, 7502, 7364, 7397, 7464, 7523, 7539, 7495, 7436, 7182, 7187, 7439, 7225, 7260, 7184, 7212, 3764, 7321, 7521]. **Annuities** [4265]. **Anomalies** [1869]. **Anomalous** [39]. **ANOVA** [5634]. **ANR** [6401]. **ANSI** [6516, 1860, 1861, 4090]. **ANSI/IEEE** [6516, 1860, 1861]. **Answer** [1353]. **Anti** [51]. **Anti-Aircraft** [51]. **Anticipation** [4442, 5053]. **Anticipator** [5568, 4686, 2539]. **anticipators** [6103]. **anticipatory** [3801, 3694]. **Antikythera** [5915]. **antilogarithmic** [4642, 5484]. **Antitrust** [5361]. **Anton** [5554]. **Antonio** [7321]. **ANTS** [7518]. **ANTS-VII** [7518]. **Anwendungen** [1975]. **Anwendungsgebiete** [1484]. **anwendungsorientierten** [1236]. **Any** [5697, 1222, 6631, 6485, 4511, 4512, 4373]. **Anyway** [6739]. **AOP** [4562, 4867]. **AP** [1120, 7418]. **AP-120B** [1120]. **AP-ASIC** [7418]. **Apache** [5645]. **APL** [699]. **APMathLib** [4488]. **App** [6379]. **Apparatus** [612, 4343, 4007, 6308, 6576, 3857, 4027, 3888, 4030, 3753, 3921, 2120, 3698, 3370]. **APPAs** [7142]. **Appearance** [3891]. **Apple** [4523, 5335, 1161]. **APPLESOFT** [1010, 1085, 1336]. **Applicability** [1708, 6389]. **Application** [5462, 3968, 4303, 6655, 859, 1013, 6493, 3562, 7359, 7372, 7559, 6667, 7345, 40, 6671, 4002, 4335, 4825, 7471, 7516, 3581, 509, 3256, 4205, 6545, 563, 3447, 7319, 7489, 7505, 7530, 7544, 7553, 1134, 6564, 3775, 5042, 3299, 1640, 4589, 4590, 4595, 2573, 2577, 6457, 1236, 6219, 7465, 3681, 1781, 7437, 5788, 1929, 7398, 4933, 2827, 6740, 7511, 7355, 7015, 2637, 5885, 950, 6253, 4307, 2659, 1268, 6914, 4187, 2373, 2707, 7315, 3273, 3274, 2726, 5929, 1226, 4718, 6317, 5942, 2765, 3321, 5953, 2797, 4093, 2596, 3163, 2602, 5091, 108, 3004, 3697, 6364, 1471, 1472, 4484, 2313]. **Application-Oriented** [1236]. **Application-Specific** [6655, 7559, 7471, 7516, 7489, 7530, 7544, 7465,

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5905, 5383, 1809, 5898, 735, 4842, 967, 2710, 5923, 6691, 3270, 3271, 1985, 4229, 6198, 683, 6715, 3142, 2444, 5426, 2963, 3334, 4914, 5963, 4620, 4922, 3345, 4769, 4125, 2626, 6054]. **Fixed-Point-Arithmetic** [6656]. **Fixed-Posit** [6803]. **fixed-precision** [2305]. **Fixed-Rate** [6004]. **Fixed-Size** [1820, 4063]. **Fixed-Slash** [1138, 910, 1147]. **Fixed-Width** [5562, 3794]. **Fixed-Word-Length** [389]. **fixing** [6235]. **flag** [5453]. **flagged** [4979]. **flags** [5214]. **Flap** [5556]. **flash** [5199]. **Flaw** [3414, 3499, 3387, 3344]. **FLECKmarks** [3576]. **flerformat** [1739]. **Flex** [2061]. **Flex/32** [2061]. **FlexBlock** [7076]. **flexibility** [3200]. **Flexible** [5507, 6529, 6801, 6802, 5831, 6300, 4566, 1885, 7076, 697, 4760, 2836, 6747, 4532]. **flexiblen** [1885]. **Flexpoint** [6458]. **Fließkomma** [2302, 2303, 2304, 2483, 2484, 1475]. **Fließkomma-Arithmetik** [2302, 2303, 2304, 2483, 2484, 1475]. **Fließkommapakets** [2303]. **Flight** [3781, 3633]. **flip** [5944]. **Float** [2113, 2453, 5800, 6372, 5154, 5016, 6029, 6534, 3331]. **Float-Fix** [6534]. **float-float** [5154]. **float-point** [6029]. **float-Precision** [3331]. **float-to-string** [6372]. **float.h** [2791, 2585]. **Float16** [6992]. **Float8** [6992]. **FLOATing** [5624, 2039, 4496, 6993, 3961, 2633, 5801, 6987, 2036, 6478, 4644, 4955, 5243, 5802, 6033, 6138, 6642, 5574, 4491, 4645, 3845, 6989, 2172, 2173, 4493, 4956, 217, 416, 3965, 5662, 6239, 6480, 6990, 6753, 6240, 1484, 2856, 2857, 2858, 3028, 3029, 3030, 3031, 3032, 3215, 3216, 3217, 3219, 3543, 4650, 5122, 5124, 6038, 6377, 6379, 6648, 6991, 5664, 5665, 5808, 5809, 1947, 169, 1803, 5887, 6764, 4304, 2320, 4966, 1367, 1808, 3392, 5978, 1012, 3393, 3394, 3972, 4154, 4155, 4156, 1949, 4504, 2326, 4311, 1950, 4791, 6767, 1576, 2503, 2187, 3721, 6494, 5676, 860, 1014]. **Floating** [1094, 2047, 2330, 2653, 2868, 4511, 4512, 5254, 5474, 5678, 5892, 6044, 6045, 6046, 6384, 6770, 7002, 3400, 3401, 7003, 1578, 1579, 3402, 2050, 1718, 6047, 2505, 2051, 727, 2332, 5259, 5895, 6152, 105, 1266, 1267, 1376, 6501, 4320, 4804, 4978, 6388, 6659, 7011, 3560, 6504, 2507, 5480, 247, 6390, 864, 5690, 171, 3231, 3407, 1497, 1498, 5394, 5134, 6663, 2663, 1583, 5582, 2667, 3566, 4325, 5483, 5819, 6887, 1270, 2670, 2671, 2672, 5981, 6049, 6266, 3055, 3987, 1724, 2513, 730, 1196, 1385, 1501, 1502, 1725, 1824, 2204, 2343, 3057, 3990, 6156, 3992, 1197, 1198, 1274, 1387, 1726, 5901]. **Floating** [3868, 3996, 5137, 5269, 5491, 5492, 2873, 4328, 4813, 3415, 3416, 3575, 2061, 2062, 3418, 3731, 6163, 6159, 3576, 3870, 3872, 4333, 6786, 2348, 2517, 2518, 6672, 4002, 4003, 4335, 2206, 4822, 616, 2350, 2883, 3246, 4342, 4528, 4530, 4682, 4825, 5907, 5908, 6056, 6791, 6162, 1964, 5275, 4686, 6906, 5277, 5145, 6521, 3737, 4346, 6908, 6794, 1965, 2065, 501, 6165, 3880, 1732, 1832, 2887, 2889, 1967, 5404, 504, 1394, 1833, 6409, 6678, 4534, 5285, 5503, 3426, 3741, 4013, 4180, 3253, 5504, 1837, 4695, 6168, 2213, 1278, 6797, 6798, 962, 1511, 3427, 1203, 6526, 1513, 4696, 6169, 5593, 4186]. **Floating** [7025, 821, 2215, 6527, 6679, 7027, 5003, 5827, 1279, 2216, 2893, 6281, 4536, 2701, 5711, 2528, 3256, 3744, 227, 228, 1607, 1970, 5509, 823, 877, 4025, 5830, 880, 1284, 6803, 1740, 2372, 2704, 2705, 4704, 965, 5406, 5920, 6282, 6682, 966, 1032, 1402, 1609, 6683, 4355, 4544, 5514, 306, 1610, 307, 677, 2219, 2220, 2376, 1848, 1849, 4192, 7032, 5720, 5721, 2711, 6176, 6286, 6287, 6288, 6805, 7127, 4853, 3750, 969, 391, 392, 3437, 3755, 4032, 4195, 4196, 5157, 5297, 3890,

6536, 3260, 2538, 1035, 1036, 3604, 3089, 6807, 5597, 1615, 1975, 1296, 435]. **Floating** [6690, 4364, 970, 6544, 3445, 5523, 2540, 5727, 1298, 2542, 2716, 2906, 6180, 6692, 6298, 1300, 1409, 5306, 5836, 3893, 1131, 6183, 1618, 5162, 3896, 6549, 1860, 1861, 1862, 2086, 2087, 6550, 7041, 7042, 4214, 5167, 5736, 6695, 3100, 3101, 4209, 3278, 342, 1864, 4213, 5164, 5598, 6086, 2911, 5925, 3102, 3103, 5739, 6301, 5528, 5742, 5744, 5926, 5928, 6302, 6430, 4045, 4371, 3898, 5529, 1303, 1626, 1221, 2395, 6189, 6306, 6701, 255, 6308, 1627, 5931, 6190, 626, 344, 1223, 1307, 1416, 1986, 2234, 2917, 3765, 3899, 3900, 4218, 4372, 4561, 4861, 4862, 5023, 5413, 5838, 4375, 3767, 742, 745, 3288, 7046]. **Floating** [5310, 3289, 1870, 5748, 2549, 6559, 1750, 890, 1041, 258, 2550, 3292, 5532, 827, 4226, 3460, 2411, 2924, 2925, 1138, 5315, 5316, 5842, 4384, 3774, 750, 751, 893, 1987, 4567, 895, 1045, 752, 6091, 5844, 5935, 3296, 6566, 6567, 6926, 6927, 6314, 6315, 4572, 4874, 6707, 6095, 6193, 6318, 6320, 5180, 1636, 6098, 5038, 2104, 349, 2421, 2744, 2746, 2933, 6195, 4575, 4876, 5041, 6196, 6323, 6569, 5757, 5758, 6822, 1528, 440, 5324, 5325, 7055, 7057, 6200, 1141, 6445, 2106, 5184, 6004, 6446, 831, 904, 1430, 570, 5759, 6201, 3300, 2938, 2939, 2249, 2428, 6331, 6575, 2750, 1889, 4890, 2559, 94]. **Floating** [6577, 1759, 639, 686, 2561, 5946, 3644, 979, 6449, 1640, 2757, 7063, 1642, 6203, 3131, 5854, 6826, 4586, 525, 576, 910, 1147, 3789, 5766, 402, 2566, 1148, 4406, 6936, 6337, 1998, 6338, 3476, 3140, 5618, 4407, 7067, 7138, 982, 2257, 5543, 5334, 3792, 449, 6009, 6010, 6341, 6342, 6343, 6586, 6587, 362, 2436, 5545, 1531, 1763, 6206, 641, 1895, 2118, 2260, 2440, 2441, 3145, 5059, 5622, 6208, 6452, 1437, 3920, 1151, 2119, 2769, 7077, 4414, 2447, 2448, 6454, 6590, 6720, 5949, 915, 5066, 5950, 6016, 3796, 5193, 5342, 7076, 3486, 2778, 4084, 3656, 3658, 3660, 3799, 3800]. **Floating** [4083, 5069, 2573, 2966, 2574, 5952, 4421, 2781, 2782, 5428, 7079, 2003, 644, 1058, 1324, 2577, 2266, 4260, 6214, 645, 6726, 1156, 1234, 1326, 5954, 6017, 5626, 2129, 7084, 701, 4263, 4429, 6018, 2270, 2789, 2790, 3156, 2007, 6595, 5550, 837, 2793, 2977, 1772, 6122, 2586, 3159, 4907, 5627, 5435, 5436, 2008, 6459, 6460, 2276, 991, 2980, 2277, 1238, 3674, 921, 922, 6218, 2278, 993, 3162, 2279, 4612, 5628, 2280, 6220, 2801, 5076, 5444, 5445, 5630, 5959, 4269, 6729, 6465, 1540, 6355, 1679, 453, 1680, 6356, 3936, 3937, 5078, 1543, 4100, 2598, 1454, 1775, 4918, 5080, 5352, 2286, 4108, 4275, 4445]. **Floating** [4759, 5081, 5783, 7094, 4619, 5083, 2987, 1685, 7099, 1776, 5640, 5871, 2599, 3685, 4922, 2465, 269, 212, 2149, 2988, 2017, 5786, 1546, 2467, 787, 1686, 2809, 2994, 3182, 3183, 3184, 3347, 3690, 3691, 2291, 5964, 6228, 6966, 7105, 3348, 6127, 6128, 6607, 2020, 2021, 1689, 1690, 2999, 5965, 2605, 4923, 5211, 5212, 5213, 5214, 5449, 5450, 5451, 5452, 5453, 2813, 3000, 843, 1338, 1458, 1459, 1785, 5556, 3947, 3948, 5094, 1340, 2295, 4119, 2025, 5874, 4278, 6229, 3950, 1786, 5558, 2474, 2611, 2612, 3006, 5097, 5098, 1465, 5559, 6737, 1789, 5221, 5365, 3522, 4930, 6130, 6620, 4127, 592]. **Floating** [3352, 4462, 6362, 7108, 6026, 7109, 6470, 1072, 5366, 2027, 3832, 848, 5367, 5560, 2826, 3194, 3523, 2828, 6739, 3355, 6363, 2830, 2831, 1349, 5101, 1075, 5561, 5876, 3700, 1350, 3835, 3197, 6234, 6471, 6472, 2303, 3954, 215, 6371, 1469, 1701, 2621, 1702, 5107, 5230, 5374, 5375, 5568, 5569, 5651, 5654, 6474, 1556, 1354, 1471, 1472, 1473, 1474,

3958, 2033, 5795, 7112, 2034, 3015, 3016, 5969, 216, 3205, 2306, 6236, 2840, 4288, 6135, 134, 1797, 5233, 5970, 2629, 799, 1357, 3023, 1706, 3534, 5381, 5798, 4142, 948, 1941, 6744, 6859, 6860, 5972, 6635, 5114, 5572, 5658, 5115, 5382, 5239]. **Floating** [6637, 5588, 5705, 5904, 4631, 6366, 4286, 1937, 2174, 3380, 5383, 662, 2855, 1943, 1944, 6476, 3963, 1564, 5661, 6238, 3027, 3710, 3847, 5463, 5464, 6036, 6140, 6037, 720, 296, 1485, 2496, 2638, 3033, 3218, 3385, 3386, 3387, 3388, 4495, 6378, 6485, 6486, 6992, 2497, 1085, 1010, 5666, 1800, 2316, 1801, 1802, 1362, 2318, 1569, 1570, 2041, 2319, 4789, 6144, 4152, 1487, 2500, 2865, 3041, 5578, 5890, 2043, 1368, 1807, 2182, 2501, 2183, 5891, 4307, 2045, 2323, 6997, 2647, 3225, 3043, 2324, 4310, 5249, 5250, 1091, 2184, 1370, 2327, 5814, 4794, 2502, 1190]. **floating** [5130, 3857, 2328, 6255, 2329, 2188, 2650, 2651, 3049, 1813, 4315, 4510, 4660, 4797, 4798, 4799, 5131, 5253, 5979, 6257, 3722, 1716, 299, 2189, 666, 5256, 5580, 4318, 3858, 1015, 4802, 5391, 5581, 7005, 7006, 7121, 2190, 1016, 1193, 6387, 5818, 6660, 3230, 4979, 3561, 1815, 2192, 2660, 7123, 6389, 1954, 6505, 1377, 6506, 3406, 6264, 1378, 4809, 4980, 2665, 3232, 379, 1585, 6391, 3861, 4983, 1818, 2056, 2669, 3728, 3863, 5898, 1380, 1722, 2202, 2339, 4516, 5488, 3985, 3986, 5982, 4811, 4812, 3989, 1589, 5490, 5698, 6157, 4169, 2678, 1104, 1961, 3995, 4678, 4523, 421]. **floating** [5493, 3417, 5700, 2346, 2874, 2875, 2876, 3871, 4001, 3241, 6274, 2683, 6275, 5400, 5401, 959, 1276, 2685, 6401, 5985, 5706, 3063, 2882, 3245, 3421, 4529, 4683, 4824, 6161, 6058, 4004, 3065, 249, 4828, 5144, 5274, 4343, 961, 4532, 5589, 6675, 5146, 2520, 5279, 2521, 4993, 2352, 4176, 2886, 5280, 2207, 502, 1733, 1734, 2888, 5991, 4007, 1202, 5282, 5147, 5501, 734, 1116, 4999, 4181, 4182, 6914, 4693, 4694, 5592, 1512, 1968, 2364, 1736, 1969, 819, 508, 3742, 1204, 5289, 1029, 6280, 2894, 2368, 4842, 6680, 4700, 5829, 4701, 282, 3080, 3257, 4703, 4845, 3081, 2530, 621, 879]. **floating** [1030, 1208, 1283, 1739, 3433, 2896, 3082, 1031, 2706, 1843, 5511, 1844, 2534, 1845, 5715, 2374, 4848, 4849, 1846, 5407, 5995, 6072, 6531, 1287, 2375, 252, 178, 3887, 2379, 1850, 4358, 4852, 3888, 2536, 4028, 6687, 6688, 3084, 4029, 5011, 3598, 5835, 7034, 4030, 4547, 4707, 6535, 2898, 2899, 3600, 6418, 3087, 3439, 3601, 1291, 1407, 1213, 1974, 3603, 2221, 3440, 1408, 1297, 3265, 3094, 4036, 2222, 4555, 2904, 2539, 3095, 2715, 5302, 5303, 1744, 2907, 6423, 6548, 6693, 5729, 2084, 5730, 516, 826, 1215, 2387, 5732, 681, 2389, 1218, 1863, 1746, 3280, 3613, 5165, 5166, 5168, 5524, 2225, 2226]. **floating** [4040, 4558, 7133, 3612, 1133, 1219, 1866, 2390, 4714, 5924, 2910, 4560, 5740, 5741, 1624, 3283, 5997, 6187, 6303, 6304, 6429, 201, 2088, 3616, 5998, 6433, 2229, 2915, 3106, 3284, 5999, 2231, 2399, 2400, 2232, 3107, 2092, 2093, 3454, 3619, 3620, 4217, 4219, 5600, 5746, 4716, 2919, 3286, 3456, 3622, 3287, 6089, 628, 473, 744, 2403, 2404, 2405, 2406, 746, 747, 1224, 2239, 2098, 1632, 311, 520, 4868, 4869, 6311, 2738, 1225, 1226, 2410, 2412, 2413, 1751, 1874, 1527, 1752, 5607, 6817, 3628, 3906, 4385, 3119, 3295, 4872, 5609, 2928, 3461, 5317, 829, 897, 973, 1993]. **floating** [4229, 5936, 6093, 4873, 2555, 3297, 899, 975, 2930, 7052, 2245, 2246, 5938, 6438, 6317, 3909, 3910, 5846, 5181, 7135, 6198, 755, 2745, 2932, 3121, 4574, 5849, 6099, 6002, 5942, 4877, 3782, 4399, 4580, 351, 4582, 3913, 4878, 524, 571, 5613, 1757, 5328, 3635, 5614, 5944, 1638, 5330, 5331, 4237, 6006, 4880, 6576,

2251, 1050, 1995, 1313, 2945, 3642, 573, 640, 757, 758, 401, 688, 689, 574, 6007, 2253, 4882, 1996, 1997, 980, 909, 3130, 1434, 2565, 4587, 4731, 6106, 3133, 2255, 2115, 2760, 5053, 2256, 5333, 3139, 6714, 7066, 1646, 1647, 1648, 695, 2567, 5767, 5857, 3478, 5335, 4889, 5055]. **floating** [5337, 5338, 5339, 5423, 5544, 6939, 2568, 1999, 3919, 5058, 5425, 319, 1894, 2259, 2439, 2442, 2766, 3652, 6012, 2958, 2959, 917, 7073, 2445, 2446, 984, 4250, 3314, 4738, 2263, 3148, 6211, 3315, 3316, 3925, 2450, 3801, 4898, 6950, 3321, 580, 4899, 5343, 5863, 6213, 480, 4252, 3150, 3151, 5344, 5548, 6118, 5864, 985, 4255, 4089, 4258, 5773, 765, 986, 3804, 4090, 7082, 4744, 3328, 6120, 4902, 1327, 2004, 5774, 7083, 2267, 208, 700, 989, 2268, 2972, 2269, 3806, 7085, 2271, 2583, 3330, 526, 7086, 3497, 2272, 7151, 2587, 2795, 2979, 4908, 2275, 3333, 4093, 5777, 6216, 2455]. **floating** [2590, 2799, 2591, 2592, 1773, 2137, 1332, 5073, 6840, 992, 528, 1240, 1241, 1333, 706, 1062, 2981, 1063, 3334, 1677, 483, 4914, 3501, 773, 5956, 5632, 5633, 5866, 6223, 5780, 3933, 3934, 4097, 1336, 4915, 4614, 1913, 3163, 107, 5781, 5636, 6466, 997, 2982, 2461, 3935, 5637, 3677, 3337, 776, 2013, 2283, 2597, 2143, 7093, 4916, 6024, 709, 710, 3174, 3816, 4109, 4758, 5553, 2463, 3938, 4446, 4920, 4921, 5784, 3940, 3682, 2803, 2804, 2985, 2986, 2805, 3344, 3179, 2288, 3684, 3818, 4620, 926, 3180, 3510, 2016, 3511, 1065, 3942, 5207, 4116, 4447, 6732, 3819, 2470, 1688]. **floating** [1921, 2998, 4622, 2292, 1169, 2471, 2472, 4448, 4449, 4624, 5088, 5089, 5090, 5215, 5216, 5357, 5358, 5359, 5360, 1784, 1460, 292, 1461, 2024, 4766, 3694, 4122, 375, 323, 4768, 845, 2821, 2822, 3190, 3191, 5096, 1928, 3695, 147, 1464, 1787, 1930, 2298, 1934, 1788, 3007, 5220, 6360, 3008, 1696, 846, 3351, 4459, 4931, 1071, 3353, 1346, 4128, 4284, 7145, 1791, 3697, 1792, 1697, 1936, 4131, 4285, 2029, 941, 6364, 4934, 4935, 715, 794, 3698, 1793, 2619, 2480, 2482, 4465, 4466, 2031, 5228, 1351, 2833, 2162, 492, 3200, 2485, 849, 3956, 2488, 3011, 4775, 4940, 5229, 5376, 5794, 6235]. **floating** [2489, 1795, 1703, 1355, 1796, 540, 541, 542, 2164, 2305, 5108, 795, 2490, 2491, 1255, 294, 1704, 2165, 3206, 3370, 1938, 1559, 2308, 2492, 1356, 2625, 4135, 1798, 1560, 4943, 5235, 5571, 5796, 947, 2628, 4137, 4289, 4944, 4945, 5797, 598, 797, 2845, 6979, 194, 2847, 2311, 2493, 2849, 2850, 3209, 3842, 7147, 5237, 4950, 4951, 5116, 5118, 4641, 4781, 4782, 2313, 6750, 6984, 5140, 2349, 2686, 1252, 6496, 1731, 3897, 4875, 1884, 3649, 3192, 2302, 2303, 2304, 2483, 2484, 1475, 5587, 995]. **floating-** [5383, 5898]. **Floating-Decimal** [134]. **Floating-Point** [2039, 6993, 3961, 2633, 4644, 4955, 5243, 5802, 5574, 4645, 6989, 4956, 3965, 6480, 6990, 6240, 4650, 5124, 6377, 6379, 6648, 6991, 5664, 5665, 5808, 5809, 5887, 6764, 4966, 3393, 3972, 4154, 4155, 4156, 1949, 4504, 2326, 4791, 6767, 2503, 3721, 5676, 860, 1014, 1094, 2047, 2653, 2868, 5254, 5474, 5678, 5892, 6044, 6045, 6046, 6384, 6770, 3401, 3402, 2050, 6047, 2505, 2051, 727, 2332, 5895, 6152, 1266, 1267, 1376, 4320, 6388, 6659, 7011, 3560, 6504, 5480, 247, 864, 5690, 3231, 3407, 5134, 6663, 2663, 1583, 5582, 2667, 3566, 4325, 5483, 5819, 6887, 1270, 6266, 730, 1385]. **Floating-Point** [1502, 1725, 2343, 3057, 3990, 6156, 3992, 1198, 1274, 1726, 5901, 3868, 3996, 5137, 5269, 5491, 5492, 2873, 4328, 3415, 3416, 3575, 2061, 6163, 6159, 4333, 6786, 2517, 2518, 6672, 4335, 4822, 616, 5907, 5908, 6056, 6791, 6906, 5277, 5145, 6521, 4346, 6908, 1965, 2065, 6165, 3880, 1732, 2887, 2889, 5404, 504, 6678, 4534,

5285, 5503, 3426, 4013, 4180, 1837, 6168, 2213, 1278, 6797, 6798, 1511, 6169, 4186, 7025, 2215, 6527, 5003, 5827, 1279, 2216, 2893, 6281, 4536, 5711, 3744, 1970, 5509, 877, 4025, 880, 1284, 6803, 2704, 2705, 4704, 5406, 5920, 6282, 6682, 1402, 1609]. **Floating-Point** [6683, 4355, 4544, 5514, 306, 2219, 2220, 2376, 1849, 4192, 7032, 5721, 6805, 4853, 969, 391, 392, 5297, 3890, 2538, 6807, 5597, 1975, 970, 6544, 2542, 2716, 2906, 6180, 6298, 1300, 5306, 5836, 3893, 1131, 6183, 1618, 6549, 1860, 1861, 1862, 2086, 2087, 6550, 7041, 5167, 5736, 6695, 3100, 3101, 4209, 342, 5598, 6086, 5925, 5528, 5742, 5744, 5926, 5928, 6302, 6430, 4371, 3898, 5529, 1221, 6189, 6306, 6701, 1627, 5931, 6190, 344, 1223, 1307, 1416, 1986, 2917, 3765, 3899, 3900, 4218, 4372, 4561, 4861, 4862, 5023, 5413, 5838, 4375, 3767, 742, 745, 7046, 5310, 1870, 2549, 6559, 890, 1041]. **Floating-Point** [3292, 5532, 827, 2411, 2925, 5315, 5316, 5842, 3774, 750, 751, 893, 1045, 5935, 3296, 6566, 6567, 6926, 6927, 6315, 6193, 6320, 6098, 5038, 2746, 6195, 4876, 5041, 6196, 6323, 6569, 5757, 5758, 1528, 440, 5324, 5325, 7055, 7057, 2106, 5184, 6004, 831, 904, 1430, 570, 5759, 6201, 3300, 2938, 2939, 2249, 2428, 6331, 2750, 4890, 2559, 6577, 639, 686, 2561, 5946, 6449, 1640, 2757, 7063, 5854, 6826, 4586, 525, 576, 1148, 3476, 5618, 4407, 7067, 7138, 982, 5543, 5334, 2436, 5545, 1763, 6206, 641, 1895, 2118, 2260, 2440, 2441, 3145, 5059, 5622, 6208, 6452, 1151, 2769, 2447]. **Floating-Point** [2448, 6454, 6590, 6720, 915, 5066, 5193, 5342, 2778, 4084, 3658, 3660, 3799, 2966, 5952, 2781, 2782, 5428, 7079, 2003, 644, 1324, 2577, 2266, 6726, 6017, 7084, 701, 4263, 6018, 2789, 2790, 3156, 6595, 5550, 4907, 5627, 5435, 5436, 6460, 2276, 2277, 1238, 3674, 921, 922, 6218, 2278, 993, 3162, 2279, 4612, 2280, 2801, 5076, 5444, 5445, 5630, 5959, 6729, 6465, 1680, 6356, 3937, 1543, 4100, 1454, 1775, 4918, 5080, 5352, 4445, 4759, 5081, 5783, 7094, 5083, 2987, 7099, 5640, 5871, 3685, 2465, 212, 2988, 2809, 2994, 3182, 3183, 3347, 3690, 3691, 2291, 5964, 6228, 6966, 7105, 6127, 6128, 6607]. **Floating-Point** [2020, 2999, 2605, 4923, 1458, 1459, 1785, 5556, 5094, 1340, 5874, 1786, 5558, 2474, 2611, 2612, 3006, 1465, 5559, 6737, 1789, 3522, 4930, 6130, 6620, 4127, 592, 3352, 6362, 6026, 7109, 5366, 2027, 848, 5560, 2826, 3523, 2828, 6739, 3355, 6363, 5876, 3835, 3197, 6234, 6472, 2303, 215, 1469, 1701, 2621, 5107, 5230, 5374, 5375, 5568, 5569, 5654, 1354, 2033, 3016, 216, 3205, 2306, 6236, 5233, 2629, 799, 3023, 1706, 5381, 4142, 6859, 6860, 6635, 5114, 5572, 5658, 5115, 5382, 5239, 6637, 5705, 5904, 4631, 6366, 4496, 6987, 4491, 2172, 2173, 416, 3219, 1947, 4304, 6494, 2330, 7002, 7003]. **Floating-point** [1578, 1579, 1718, 5259, 6501, 4804, 4978, 2507, 6390, 2670, 2671, 2672, 5981, 6049, 1501, 1824, 2204, 2062, 3731, 5275, 4686, 1394, 4695, 2528, 2372, 307, 3750, 5157, 1296, 5523, 1298, 3896, 7042, 4214, 4213, 4045, 3288, 258, 2924, 4567, 895, 6091, 6314, 4572, 4874, 6707, 2421, 6822, 6445, 1759, 3644, 979, 3131, 6936, 6337, 2257, 3920, 2119, 2574, 5626, 2007, 2008, 6220, 3936, 4275, 4922, 2149, 2467, 2295, 2025, 4278, 6229, 7108, 3832, 5367, 3194, 2830, 2831, 1075, 3700, 1350, 6471, 1471, 1472, 1473, 1474, 5970, 6744, 5588, 1937, 2174, 3380, 2855, 3963, 1564, 6238, 5464, 6140, 720]. **floating-point** [1485, 2638, 3033, 3385, 3386, 3387, 4495, 6378, 6485, 2497, 1085, 5666, 1800, 2316, 1801, 1802, 6144, 4152, 2865, 3041, 5578, 5890, 5891, 2323, 6997, 2647, 2324, 4310, 5249, 5250,

2184, 2327, 5814, 4794, 5130, 2329, 2188, 2650, 3049, 1813, 4315, 4797, 4798, 5131, 5979, 6257, 3722, 2189, 5256, 5580, 4318, 1015, 4802, 5391, 5581, 7005, 7006, 2190, 1016, 1193, 6387, 5818, 6660, 3230, 4979, 2192, 7123, 6505, 1377, 3406, 4980, 1585, 6391, 4983, 2056, 2669, 3863, 4516, 3986, 3989, 1589, 5490, 5698, 6157, 1961, 3995, 4678, 5493, 2346, 2874, 2875, 2876, 4001, 6275, 5400]. **floating-point** [5401, 2685, 6401, 5706, 3063, 4529, 4004, 3065, 249, 4828, 5144, 5274, 4343, 961, 4532, 5146, 4993, 2352, 4176, 2886, 5280, 502, 1733, 1734, 5991, 5282, 734, 1116, 4182, 6914, 1968, 1736, 1969, 819, 508, 5289, 1029, 6280, 2894, 2368, 4842, 6680, 4700, 4703, 4845, 3081, 621, 879, 1030, 1208, 1283, 1739, 3433, 2896, 3082, 1843, 5511, 1844, 2534, 1845, 5715, 4848, 4849, 5995, 6072, 6531, 1287, 252, 178, 1850, 4358, 4852, 6687, 6688, 5011, 3598, 5835, 4030, 4547, 4707, 2898, 2899, 3439, 3601, 1407, 1213, 1974, 3440, 3265, 4555, 2539, 5302, 5303, 1744, 6423, 6548, 6693]. **floating-point** [5729, 2084, 5730, 1215, 5732, 2389, 1218, 1863, 1746, 3613, 5166, 5168, 5524, 2225, 2226, 4040, 7133, 1133, 1219, 1866, 4714, 5924, 2910, 5740, 5741, 1624, 5997, 6187, 6303, 6304, 6429, 5998, 2231, 2399, 2400, 3107, 2092, 2093, 3454, 3619, 3620, 4217, 4219, 5600, 5746, 4716, 2919, 3286, 3456, 3287, 628, 473, 744, 2403, 2404, 2405, 2406, 4868, 6311, 2738, 2410, 2412, 2413, 1527, 1752, 5607, 6817, 3628, 3906, 4872, 5609, 3461, 829, 897, 973, 4229, 5936, 6093, 4873, 2555, 3297, 7052, 2245, 2246, 5938, 6438, 6317, 3909, 3910, 5846, 6198, 755, 2745, 2932, 3121, 4574, 6099, 6002, 5942]. **floating-point** [4877, 4399, 4580, 4582, 3913, 4878, 524, 571, 5613, 1757, 5328, 5614, 5944, 1638, 4237, 6006, 4880, 6576, 1050, 1995, 573, 640, 757, 758, 401, 688, 574, 6007, 4882, 1996, 1997, 1434, 6106, 2255, 2115, 2760, 5053, 5333, 1647, 1648, 695, 2567, 5767, 5857, 3478, 5335, 4889, 5055, 5337, 5338, 5339, 5423, 5544, 6939, 2568, 1999, 3919, 5058, 5425, 1894, 2259, 2439, 2442, 2766, 3652, 6012, 2958, 2959, 7073, 2445, 2446, 984, 4250, 4738, 2263, 3148, 6211, 3316, 3925, 6950, 4899, 5343, 5863, 6213, 480, 4252, 3150, 5344, 5548, 5864, 985, 5773, 986, 3804, 4090, 7082, 4744, 4902, 5774, 2267]. **floating-point** [700, 989, 2268, 2972, 3806, 7085, 2271, 2583, 3330, 2587, 2795, 2979, 4908, 4093, 6216, 1332, 5073, 6840, 1240, 1241, 1333, 706, 1062, 2981, 3334, 1677, 4914, 3501, 773, 5956, 5632, 5633, 5866, 6223, 5780, 3933, 1336, 4915, 4614, 1913, 5781, 5636, 997, 2982, 2461, 3935, 5637, 776, 2013, 2283, 4916, 6024, 709, 710, 3174, 3816, 4109, 4758, 5553, 3938, 4446, 4920, 4921, 3940, 3682, 2803, 2804, 2985, 2986, 3179, 2288, 3684, 3818, 4620, 2016, 3942, 4116, 4447, 6732, 3819, 2998, 2292, 1169, 2471, 2472, 4448, 4449, 4624, 5359, 5360, 1784, 1460, 292, 1461, 2024, 4766, 4122, 375]. **floating-point** [4768, 845, 2821, 2822, 3190, 5096, 147, 1464, 1787, 1930, 1934, 3007, 6360, 1696, 3351, 4459, 4931, 3353, 1346, 4284, 1791, 1697, 1936, 4131, 4285, 2029, 941, 6364, 4934, 4935, 715, 794, 2480, 2482, 4465, 4466, 5228, 1351, 2162, 2485, 849, 3956, 4775, 4940, 5229, 5376, 5794, 6235, 1795, 1703, 2305, 5108, 795, 2490, 1255, 294, 3206, 1938, 2308, 1356, 1798, 1560, 4943, 5235, 5571, 5796, 947, 2628, 4137, 4289, 4944, 4945, 5797, 2845, 6979, 2847, 2311, 2493, 2850, 3209, 3842, 7147, 5237, 4950, 4951, 5116, 5118, 4782, 2313, 6750, 6984, 5140, 2686, 5587, 6496, 1731, 3897, 4875, 1884, 3192, 2302]. **Floating-point** [2303, 2304, 2483, 2484, 1475, 995]. **floating-point-number** [5784]. **Floating-point-Pegasus**

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2045, 2323, 6997, 2647, 3225, 3043, 2324, 4310, 5249, 5250, 1091, 2184, 1370, 2327, 5814, 4794, 2502, 1190, 5130, 3857, 2187, 2328, 6255, 6494, 2329, 2188, 2330, 2650, 2651]. **point** [3049, 1813, 4315, 4510, 4660, 4797, 4798, 4799, 5131, 5253, 5979, 6257, 7002, 3722, 7003, 1578, 1579, 1716, 299, 2189, 1718, 666, 5256, 5580, 4318, 3858, 1015, 4802, 5259, 5391, 5581, 7005, 7006, 7121, 2190, 1016, 1193, 6501, 4804, 4978, 6387, 5818, 6660, 3230, 4979, 3561, 2507, 1815, 4805, 2192, 2660, 7123, 6389, 6390, 1954, 6505, 1377, 6506, 3406, 6264, 1378, 4809, 4980, 2665, 3232, 379, 1585, 2666, 6391, 3861, 4983, 1818, 2056, 2669, 3728, 3863, 5898, 1380, 1722, 2202, 2670, 2671, 2672, 5981, 6049, 2339, 3054, 4516, 5488, 3985, 3055, 3986, 5982, 4811, 4812, 3989, 1501, 1589]. **point** [1824, 2204, 5490, 5698, 6157, 4169, 2678, 1104, 1961, 3995, 4678, 4523, 421, 2062, 5493, 3417, 5700, 3731, 2346, 2874, 2875, 2876, 3871, 4001, 3241, 6274, 2683, 6275, 5400, 5401, 959, 1276, 2685, 6401, 5985, 5706, 3063, 2882, 3245, 3421, 4529, 4683, 4824, 6161, 6058, 4004, 3065, 249, 4828, 5144, 5274, 5275, 4343, 4686, 961, 4532, 5589, 6675, 5146, 2520, 5279, 2521, 4993, 2352, 4176, 2886, 5280, 2207, 502, 1733, 1734, 1832, 2888, 5991, 4007, 1202, 1394, 5282, 5147, 5501, 734, 1116, 4999, 4181, 4182, 6914, 4693, 4694, 5592, 4695, 1512, 1968, 2364, 1736, 4696, 1969, 735, 819]. **point** [508, 821, 3742, 6679, 7027, 1204, 5289, 1029, 2073, 6280, 2894, 2368, 4842, 2528, 6680, 4700, 5829, 4701, 282, 3080, 3257, 4703, 4845, 5830, 3081, 2530, 621, 879, 1030, 1208, 1283, 1739, 3433, 2372, 2896, 3082, 1031, 2706, 1843, 5511, 967, 1844, 2534, 1845, 5715, 2374, 4848, 4849, 1846, 5407, 5995, 6072, 6531, 1287, 1610, 2375, 252, 178, 307, 2710, 3887, 2379, 1850, 4358, 4852, 3888, 2536, 4028, 6687, 6688, 3084, 4029, 3750, 5011, 3598, 5835, 7034, 4030, 4547, 4707, 6535, 3755, 5157, 2898, 2899, 3260, 3600, 4199, 6418, 1036, 3087, 3439, 3601, 1291, 1407, 5016]. **point** [1213, 1974, 3603, 2221, 3440, 1408, 1296, 3265, 3094, 5923, 4036, 2222, 3445, 5523, 4555, 2904, 2539, 3095, 1298, 2715, 5302, 5303, 1744, 6691, 2907, 6423, 6548, 6693, 5729, 3270, 3271, 2084, 5730, 516, 2721, 826, 1215, 2387, 5732, 681, 2389, 3896, 1218, 1863, 7042, 1746, 3280, 3613, 4214, 5165, 5166, 5168, 5524, 2225, 2226, 4040, 4558, 5308, 7133, 3612, 1133, 4213, 1219, 1866, 2390, 4714, 5924, 2910, 4560, 5740, 5741, 1624, 3283, 5997, 6187, 6303, 6304, 6429, 2393, 201, 2088, 4045, 3616, 5998, 6433, 2229, 2915, 3106, 3284, 5999, 2231, 2399, 2400, 2232, 3107, 1985, 626, 2092, 2093, 3454, 3619]. **point** [3620, 4217, 4219, 5600, 5746, 4716, 2919, 3286, 3456, 3622, 3287, 6089, 628, 473, 744, 2403, 2404, 3288, 3289, 2405, 2406, 746, 747, 1224, 258, 5028, 2550, 2239, 2098, 1632, 311, 520, 4868, 4869, 6311, 2738, 1225, 1226, 2410, 2412, 2413, 2924, 1751, 1874, 1527, 1752, 5607, 6817, 3628, 3906, 4385, 3119, 3295, 1987, 4872, 5609, 4567, 895, 2928, 3461, 5317, 829, 897, 973, 1993, 6091, 4229, 5936, 6093, 4873, 2555, 3297, 899, 975, 2930, 7052, 2245, 2246, 6314, 5938, 6438, 4572, 4874, 6317, 6707, 3909, 3910, 5846, 5181, 7135, 6198, 349, 755, 2421, 2745, 2932, 3121, 4574, 5849, 6099]. **point** [6002, 5942, 6822, 4877, 3782, 4399, 4580, 351, 6445, 4582, 3913, 4878, 524, 571, 683, 5613, 1757, 5328, 3635, 5614, 5944, 1638, 5330, 5331, 4237, 6006, 4880, 6576, 2251, 1889, 1050, 1995, 1313, 1759, 2945, 3642, 573, 640, 757, 758, 401, 3644, 688, 689, 979, 574, 6007, 2253, 4882, 1996, 1997, 980, 909, 3130, 6203, 3131, 1434, 2565, 4587, 4731, 5766, 6106, 3133, 2255, 2115,

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1. Table 5 (page 124):

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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- 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
- on the Interval Computations homepage `http://cs.utep.edu/interval-comp/main.html`, in the "Books" section.

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Industry immediately started to investigate the failure." From the report: "The internal SRI software exception was caused during execution of a data conversion from 64-bit floating point to 16-bit signed integer value. The floating point number which was converted had a value greater than what could be represented by a 16-bit signed integer. This resulted in an Operand Error. The data conversion instructions (in Ada code) were not protected from causing an Operand Error, although other conversions of comparable variables in the same place in the code were protected.".

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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.

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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:

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- on the Interval Computations homepage `http://cs.utep.edu/interval-comp/main.html`, in the "Books" section.

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