

List of potential typographical issues in IEEE Standard for Floating-Point Arithmetic (IEEE 754-2019 [1])

Some of the following points are additions to the errata¹ and some are observations. A few points contain potential problems which have not yet been discussed by the 754 working group and have not yet been declared as being real problems which require fixing. They were noticed when considering the usage of p and q as vectors in Sec. 9.4:

In Sec. 9.4 p is defined as “a vector of length n ” (input vector to `sum()`, `dot()`, `sum-Square()`, `sumAbs()`, `scaledProd()`, `scaledProdSum()`, and `scaledProdDiff()`). In Sec. 3.3 p is defined as “the number of digits in the significand (precision)”. Sec. 9.5 uses the latter definition of p rather than the one from the section immediately before it, without redefining it. M. Hack pointed out that this may be considered local scope usage (only for Sec. 9.4) rather than a redefinition for Sec. 9.4 and the following sections; since p is defined as precision and used across the standard, sooner or later we will need something separate from p and q in Sec. 9.4; bold lower case letters, maybe \mathbf{a} and \mathbf{b} instead of p and q may be suitable.

The following observations have been made when considering what to replace p and q with in Sec. 9.4 in order to be consistent across the standard.

1. It seems that upper case italic letters are used for bit vectors, such as S , E , T (sign, exponent bits, trailing significand) in Sec. 3.4. Exception to this may be J (upper case italic) in Sec. 3.5.2, which defines the number of *declefs*. Another exception may be N (upper case italic) in Sec. 5.3.3, which defines an integral value for forming a factor b^N .
2. The vector (string) of digits d (lower case italic) may be in a separate class on its own because it is always followed by $d_0 \cdot d_1 \dots$ and it is always visible that it is a vector.
3. In Sec. 3.4, bottom two lines on p. 19, two instances of 2^{w-1} should be in math mode: 2^{w-1} .

¹<https://speleotrove.com/misc/IEEE754-errata-2019.html>

4. In Sec. 3.5.1 in $(s, q + 1, c/10)$ the division symbol is typed differently from how it looks on p. 19 line -6 (div style 1). Its angle looks different, very steep (div style 2).
5. On p. 21, in the equations on the bottom of the page, different styles for the division symbol are present: lines 1, 2, 4 contain a new style (div style 3) and line 3 contains a previously met style (div style 1).
6. On p. 23, Table 3.6 the division symbol of (div style 3) is used.
7. On p. 31 division symbols are in mixed styles of (div style 1) and (div style 3), line -5.
8. On p. 61 division symbols are in mixed styles of (div style 1) and (div style 3). pp. 63–64 probably use (div style 3).
9. On p. 21 x is used to denote “don’t care bits”, but the meaning is described quite a bit later on p. 22.
10. In Sec. 3.5.2, p 20, paragraph b) contains G_{w+4} which should be typed in math mode: G_{w+4} .
11. In Sec. 5.3.3 N is usually in italic except in one case where it says **scaleB**($\pm\infty, N$).
12. Sec. 5.12.2 uses H and M (upper case roman), which may indicate that these quantities are in some way different from S, E, T or J, N above. $M \in \{5, 9, 17, 36\}$ and H is a number of significant digits. H also appears in Sec. 11.
13. Italic lower case symbols are used for integer parameters ($p, e, emax, s, b$ in Sec. 3.3 and other parts of the standard) or real scalars (x, y, z in Sec. 5.4.1 and other parts).
14. In Table 9.1 on p. 60, $\tanh(x)$ should have an italic x rather than x in roman font: $\tanh(x)$.
15. In Sec. 8.2, in the paragraph below **substituteXor**(x), $|x|$ appears twice; it should be typed as $|x|$.
16. On p. 61 in “the complex number $x + iy$ ” i should probably be typed as i .
17. Section 6.3 uses a, b , and c (lower case italic). Note that b is used for radix earlier. This may be considered a local-scope usage, but since this is referring to scalar real values the section could use x, y, z for consistency.
18. In Sec. 9.4, the four instances of $\sum_{(i=1,n)}$ should be typed fully in math mode: $\sum_{(i=1,n)}$.
19. In Sec. 9.4, the three instances of $\prod_{(i=1,n)}$ should be typed fully in math mode: $\prod_{(i=1,n)}$.

20. In Sec. 9.5, at the bottom two paragraphs on p. 68, x and y are typed in lower case italic, but they seem to have a different look to them than everywhere else. One instance of x, y appears consistent with the whole of the standard, but one instance of x, y and 14 instances of $x - y$ appear in a different italic font than the math mode italic font that is used across the standard.

References

- [1] *IEEE Standard for Floating-Point Arithmetic, IEEE Std 754-2019 (revision of IEEE Std 754-2008)*, Institute of Electrical and Electronics Engineers, Piscataway, NJ, USA, July 2019.