

To: J3
 Subject: RRSPACING (UTI 092)
 From: Van Snyder

1 Introduction

2 UTI 092 argues that RRSPACING(X) should be an IEEE NaN if X is IEEE Inf. On the other hand, how-
 3 ever, RRSPACING(X) can be written as ABS(FRACTION(X)) * RADIX(X) / EPSILON(X). RADIX
 4 and EPSILON are inquiry functions, so their result values don't depend upon their argument values,
 5 while the result value of FRACTION(X) is defined to be "the same value as X" if X is an IEEE infinity.
 6 I would be really surprised if ABS(Inf) or ABS(-Inf) were not Inf, so RRSPACING(\pm Inf) ought to be
 7 +Inf.

8 Malcolm argues that the definition of FRACTION is defective: IEEE infinity is not a sensible result for
 9 an IEEE infinity argument; the result ought to be NaN. I suppose it's OK to return the same NaN if
 10 the argument is NaN. Rather than make RRSPACING consistent with the defective FRACTION, we
 11 probably need an interp to correct FRACTION. Or could we just announce an incompatibility in 1.6.3?

12 2 Edits

13 Edits refer to 07-007. Page and line numbers are displayed in the margin. Absent other instructions, a
 14 page and line number or line number range implies all of the indicated text is to be replaced by associated
 15 text, while a page and line number followed by + (-) indicates that associated text is to be inserted after
 16 (before) the indicated line. Remarks are noted in the margin, or appear between [and] in the text.

17 [Editor: "zero" \Rightarrow "an IEEE NaN".] 420:9
 18 [Editor: Delete UTI 092.] 420:10+

19 3 On the other hand

20 [Editor: insert "= ABS(FRACTION(X)) * RADIX(X) / EPSILON(X)" after "*b^p*".] 420:7
 21 [Editor: "zero" \Rightarrow "IEEE_VALUE(X,IEEE_POSITIVE_INF) (14.1, 14.10.36)" or "zero" \Rightarrow "positive 420:9
 22 IEEE infinity".]
 23 [Editor: Delete UTI 092.] 420:10+

24 4 If we can change FRACTION without an interp

25 [Editor: Add a sentence: "The result of FRACTION(X) with X an IEEE infinity has been changed from 3:29
 26 that infinity to an IEEE NaN."
 27 [Editor: Delete "infinity or". Add a sentence: "If X is an IEEE infinity the result is an IEEE NaN."] 383:8