Let's denote the arithmetic for closed real intervals by $\mathbb{I}$ and that for connected real intervals by $\mathbb{J}$. Further let $\boldsymbol{a} = [a_1, a_2]$ and $\boldsymbol{b} = [b_1, b_2]$ be two floating-point intervals of $\mathbb{I}$ and $\circ$ an operation $\circ \in \{+, -, \cdot, /\}$. Then the lower bound of an interval operation $\boldsymbol{a} \circ \boldsymbol{b}$ is computed by $\bigtriangledown (a_i \circ b_j)$ and the upper bound by $\bigtriangleup (a_\mu \circ b_\nu)$ where the i, j, μ, ν are to be selected by the usual formulas for interval operations.

In general the results $a_i \circ b_j$ and $a_\mu \circ b_\nu$ will not be floating-point numbers so that the roundings have to be applied. Then arithmetic in $\mathbb{I}$ delivers the result $I = [\bigtriangledown (a_i \circ b_j), \bigtriangleup (a_\mu \circ b_\nu)]$ while arithmetic in $\mathbb{J}$ delivers $J = (\bigtriangledown (a_i \circ b_j), \bigtriangleup (a_\mu \circ b_\nu))$ and we have $J \subset I$.

More drastic examples can be given in case of *reasonable* fused operations. Consider, for instance, two interval matrices. In $\mathbb{J}$ the dot products are computed exactly with only one rounding at the end of the accumulation while in $\mathbb{I}$ a rounding is applied after each addition and each multiplication in the dot products. In addition to the difference in accuracy there is a difference in computing speed. For details see section 8.6.2 in my book *Computer Arithmetic and Validity*. The unit discussed there was built in 1993/94. The book was on the market before IEEE P1788 was founded.