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Decades-Old Floating Point Error Problem Solved

Bounded Floating Point Patent Issued

Las Vegas, NV, January 17, 2018– A breakthrough patent in processor design, which allows representation of real numbers accurate to the last digit for the first time in computer history, was issued on November 14, 2017 as US Patent No. 9,817,662.

States the inventor, Alan Jorgensen, PhD, “This bounded floating point system is a game changer for the computing industry, particularly for computationally intensive functions such as weather prediction, GPS, and autonomous vehicles. By using this system, it is possible to guarantee that the display of floating point values is accurate to plus or minus one in the last digit.”

Error in floating point operations has been known since the beginning of the computer age and can be catastrophic. The most notorious floating point error was the Patriot missile failure in Saudi Arabia, when a Patriot missile failed to destroy a Scud missile. As a result, 28 U.S. military people were killed. This occurred when the conversion of 100 hours in tenths of a second (3600000) to floating point introduced an undetectable error resulting in the missile guidance software incorrectly locating the scud missile.

All general-purpose computers, including smart phones, have hardware or software implementations of mathematical operations on floating point numbers. In most cases floating point numbers, and the operations on them, introduce an error which is undetected and can accumulate, even catastrophically, over a sequence of operations. Performing complex mathematical computations requires myriad floating point operations, each of which is likely to make the result less accurate without use of this new system.

How does it work? – The innovative bounded floating point system computes two limits (or bounds) that contain the represented real number. These bounds are carried through successive calculations. When the calculated result is no longer sufficiently accurate the result is so marked, as are all further calculations made using that value. It is fail-safe and performs in real time. It can operate in conjunction with existing hardware and software. Conversions between existing standardized floating point and this new bounded floating point format are simple operations.

About the Inventor:

Alan Jorgensen is a software testing engineer, professor, and cyber bounty hunter who has been concerned with the error in floating point calculations since 1975 while testing processor architecture. After extensive research and tests, he successfully developed a system that solved the decades-old problem.

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If you would like more information about this topic, visit www.BoundedFloatingPoint.com or contact Connie R. Masters at 985-209-4422 or at cm@BoundedFloatingPoint.com or Alan Jorgensen at alan@BoundedFloatingPoint.com.