

ABSTRACT

Fixed-point Arithmetic of Redundant Residue Number System

Authors:

Bobin Deng, School of Computer Science, Georgia Institute of Technology
Thomas M. Conte, School of Computer Science, Georgia Institute of Technology
Erik Debenedictis, Zettaflops
Jeanine Cook, Sandia National Laboratories

Dennard scaling has ended. Lowering the voltage supply to sub-volt levels causes intermittent losses in signal integrity, rendering further scaling (down) no longer acceptable as a means to lower the power required by a processor core. However, it is possible to correct the occasional errors caused due to lower Vdd in an efficient manner and effectively lower power. By deploying the right amount and kind of redundancy, we can strike a balance between overhead incurred in achieving reliability and energy savings realized by permitting lower Vdd. One promising approach is the Redundant Residue Number System (RRNS) representation. In this poster, we present two fixed-point computational methods for RRNS microarchitectures.