Abstract

In this paper, an efficient scheme for detecting and correcting overflow during addition in Residue Number System (RNS) is presented. The approach which is novel to the moduli set \(\{2^{n-1},2^n,2^{n+1}\}\) is based on the Chinese Remainder Theorem and demonstrates theoretically to be a very fast scheme compared to similar state of the art schemes. The proposed method is able to detect overflow in RNS addition without full reverse conversion; Additionally, the scheme also prevents the representation of wrong numbers as a result of overflow, thus the scheme gives the accurate result without errors whether overflow occurs or not. A comparison, which proves the efficiency of the proposed scheme, in terms of delay and area requirements is also presented.

References

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A Novel RNS Overflow Detection and Correction Algorithm for the Moduli Set \( \{2^{n-1}, 2^n, 2^{n+1}\} \)

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**Index Terms**

- Computer Science
- Algorithms

**Keywords**

- Residue Number System
- Chinese Remainder Theorem
- overflow detection
- overflow correction
- moduli set
A Novel RNS Overflow Detection and Correction Algorithm for the Moduli Set \( \{2^n-1, 2^n, 2^n+1\} \)