1983-03

Error-Correcting Codes in Binary-Coded Radix-\(r\) Arithmetic

Halatsis, Constantin

IEEE

http://hdl.handle.net/11728/6538

Downloaded from HEPHAESTUS Repository, Neapolis University institutional repository
Title: Error-Correcting Codes in Binary-Coded Radix-\(r\) Arithmetic

Year: 1983

Author: Halatsis, C., Gaitanis, N.; Sigala, M.

Abstract: This paper presents a new class of AN codes of high efficiency capable of correcting single errors in radix-\(r\) arithmetic with the binary coded digits—BCR—system. The errors corrected within a single radix-\(r\) digit are single errors of the binary digits with weight \(\pm w_i \leq r-1, i=1,2,\ldots, m\), which are used to encode the BCR digits. The corresponding arithmetic unit is made out of slices, one for each BCR digit. The AN codes considered have a generator A of the form \(A = \tau \cdot p\) where \(\tau\), \(p\) odd and \(rp=n-1 \leq \tau < p\). The paper establishes the selection criteria of \(r\) and \(p\) such that the code range of the AN codes is equal to \(M = r^k \pm 1\). The criteria are applied to the BCD system, and we determine all \(\tau < 100\) and \(p < 200\) for the most important BCD codes with weights \(\pm w_i < r-1, i = 1, 2, 3, 4\). For each BCD code, the paper gives the numbers \(\tau < 100\) for which AN codes exist, and the maximum code efficiency \(E = 2 \cdot m \cdot k/(A-1)\) attained at some \(p < 200\).