

RECENT TRENDS IN MATHEMATICAL SCIENCES  
(BOOK)  
PROCEEDINGS OF THE INTERNATIONAL  
CONFERENCE ON RECENT ADVANCES IN  
MATHEMATICAL SCIENCES  
NAROSA PUBLICATION HOUSE  
2001  
341-348

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## FUZZY RD CODES WITH RANK METRIC AND DISTANCE PROPERTIES

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In this paper we introduce a new notion called fuzzy RD-codes and it is defined as a fuzzy subset of  $n$ -tuples over a Galois field  $GF(2^N)$  where  $n \leq N$ ,  $N > 1$ . Let  $V^n$  denote the  $n$ -dimensional vector space of  $n$ -tuples over  $GF(2^N) = F^n$ ,  $n \leq N$ ,  $N > 1$ . Let  $u, v \in V^n$  where  $u = (u_1, u_2, \dots, u_n)$  and  $v = (v_1, v_2, \dots, v_n)$ ,  $u_i, v_i \in GF(2^N)$ . A fuzzy RD code word  $f_\mu$  is a subset of  $V^n$  defined by  $f_\mu = \{(v, f_\mu(v) \mid v \in V^n\}$  where  $f_\mu(v)$  is the membership function. We study these fuzzy RD codes and show that in case of asymmetric, unidirectional and symmetric error models, fuzzy RD codes behave differently from fuzzy codes built using Hamming metric. Further fuzzy RD-code words are not invariant to the dimension of the code space in terms of distance.

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