

On the construction of perfect deletion correcting codes

Citation for published version (APA):

Bours, P. A. H. (1991). On the construction of perfect deletion correcting codes. In A. J. H. Vinck (Ed.), *Proceedings of the International Winter Meeting on Coding and Information Theory : December 15-17, 1991* (pp. 8). (Preprint-Serie des Instituts für Experimentelle Mathematik; Vol. 1991, No. 19). Universität Essen.

Document status and date:

Published: 01/01/1991

Document Version:

Publisher's PDF, also known as Version of Record (includes final page, issue and volume numbers)

Please check the document version of this publication:

- A submitted manuscript is the version of the article upon submission and before peer-review. There can be important differences between the submitted version and the official published version of record. People interested in the research are advised to contact the author for the final version of the publication, or visit the DOI to the publisher's website.
- The final author version and the galley proof are versions of the publication after peer review.
- The final published version features the final layout of the paper including the volume, issue and page numbers.

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On the Construction of Perfect Deletion Correcting Codes

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We consider a way to construct perfect codes capable of correcting 2 or more deletions using design–theory.

We will use an alphabet $A(v) = \{0, 1, \dots, v-1\}$ of size v . Let $A_k(v)$ denote the set of words of length k over the alphabet $A(v)$ and let C_t be a subset of $A_k(v)$ such that every word of length t over $A(v)$ is a subword of exactly one word of C_t . Now C_t is called a perfect $(k-t)$ –deletion correcting code over $A(v)$.

Our construction consists of two steps.

First $A_k(v)$ is partitioned into some classes K_1, K_2, \dots, K_p in such a way that if we choose a word x from class K_i as a codeword, it is easy to see how many words of other classes may not be chosen as codewords. Now the problem is reduced to finding subsets L_i of K_i ($i = 1, 2, \dots, p$) such that $C_t = L_1 \cup L_2 \cup \dots \cup L_p$, and we will derive some relations on the sizes of these sets L_i . From this we can also find upperbounds on the cardinality of insertion/deletion correcting codes.

In the second step we will use design theory for the construction of the elements of the subsets L_i ($i = 1, 2, \dots, p$).