

On the Coverings of $\{0,1,2\}^n$ with Minimal Cardinality

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The paper deals with a Coding Theory problem known as the inverse football pool problem. It is about finding the minimal cardinality $T(n)$ of a covering of $Q_n = \{0,1,2\}^n$. A covering is here defined as a code A with the following property: for every x in Q_n there exists y in A such that the Hamming distance $d(x,y)$ is equal to n . The first non-trivial value of $T(n)$ is for $n=7$ as it is not obtained by having an equality in the recurrence relation $T(n) \geq \frac{3}{2} T(n-1)$. With a proof by exhaustion, compiled on a computer, David Brink has determined that $T(7)=29$. In our research we gain a better understanding of the very problem by proving the same result by a non-exhaustive method.

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