



Gilbert-Varshamov, not in the book

We looked at an existence theorem about codes that were not in the book. The following is true for binary linear codes:

There exist a binary linear code of length n , dimension k and distance d if:

$$\binom{n-1}{0} + \binom{n-1}{1} + \dots + \binom{n-1}{d-2} < 2^{n-k}.$$

A corollary to this is the following:

If $n \neq 1$ and $d \neq 1$, then there exist a binary linear code C with length n and distance greater than or equal to d such that

$$|C| \geq \frac{2^{n-1}}{\binom{n-1}{0} + \binom{n-1}{1} + \dots + \binom{n-1}{d-2}}.$$