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The original motivation of this work is estimation of the asymptotic value of the logarithm of the number of maximal antichains in the Boolean lattice. This is the same as estimating the maximal independent sets in the comparability graph of the Boolean lattice.

In joint work with Peter Frankl and Vojtech Rodl, we have considered the following related estimation problem. For integers $k < n$, let $\text{mis}(n,k)$ denote the number of maximal independent sets in the bipartite graph defined by the k and $k+1$ levels of the Boolean lattice of all subsets of an n -set. If k/n tends to 0 as n grows, it is easy to determine the asymptotic value of $\log \text{mis}(n,k)$. Our most substantial result for k a fixed proportion of n is the upper bound:

$$\log \text{mis}(n,k) < 1.3563 (1 + o(1)) C(n-1,k)$$

where $o(1)$ tends to 0 as n grows and $C(n-1,k)$ is the binomial coefficient. (Received February 01, 2009)