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**A tighter upper bound for random MAX 2-SAT.** (English) Zbl 1260.68164  
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Summary: Given a conjunctive normal form  $F$  with  $n$  variables and  $m = cn$  2-clauses, it is interesting to study the maximum number  $\max F$  of clauses satisfied by all the assignments of the variables (MAX 2-SAT). When  $c$  is sufficiently large, the upper bound of  $f(n, cn) = \mathbb{E}(\max F)$  of random MAX 2-SAT had been derived by the first-moment argument. In this paper, we provide a tighter upper bound  $(3/4)cn + g(c)cn$  also using the first-moment argument but correcting the error items for  $f(n, cn)$ , and  $g(c) = (3/4) \cos((1/3) \times \arccos((4 \ln 2)/c - 1)) - 3/8$  when considering the  $\varepsilon^3$  error item. Furthermore, we extrapolate the region of the validity of the first-moment method is  $c > 2.4094$  by analyzing the higher order error items.

**MSC:**

- 68Q17** Computational difficulty of problems (lower bounds, completeness, difficulty of approximation, etc.)  
**68Q25** Analysis of algorithms and problem complexity

Cited in 4 Documents

**Keywords:**

MAX 2-SAT; upper bound; first-moment argument; computational complexity

**Software:**

MAX-2-SAT

**Full Text:** [DOI](#)

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