

The Number of 3-SAT Functions

A *k*-SAT function of (Boolean) variables x_1, \dots, x_n is one that can be expressed as

$$C_1 \vee \dots \vee C_t, \tag{1}$$

with each C_i a *k*-clause (that is, an expression $y_1 \wedge \dots \wedge y_k$, with $y_1 \dots y_k$ literals corresponding to different variables x_i). Writing $G_3(n)$ for the number of 3-SAT functions of x_1, \dots, x_n , we prove

Theorem $G_3(n) \sim 2^{n + \binom{n}{3}}$.

This is a strong form of a conjecture of Bollobás, Brightwell and Leader stating that $\log_2 G_3(n) < (1 + o(1)) \binom{n}{3}$.

[Joint with Liviu Ilincă]