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Progress Towards Counting D_5 Quintic Fields

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Let $N(5,D_5,X)$ be the number of quintic number fields whose Galois closure has Galois group D_5 and whose discriminant is bounded by X. By a conjecture of Malle, we expect that $N(5,D_5,X) \sim C X^{1/2}$ for some constant C. The best known upper bound is $N(5,D_5,X) \ll X^{3/4 + \epsilon}$, and we show this could be improved by counting points on a certain variety defined by a norm equation; computer calculations give strong evidence that this number is $\ll X^{2/3}$. Finally, we show how such norm equations can be helpful by reinterpreting an earlier proof of Wong on upper bounds for A_4 quartic fields in terms of a similar norm equation.

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