CSGT 2014, June 9–13 2014, Teplice nad Bečvou
49th Czech-Slovak Conference on Graph Theory 2014
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CAYLEY GRAPHS OF DIAMETER TWO AND OF ORDER $\frac{d^2}{2}$

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The number of vertices of a graph of diameter two and maximum degree d is at most d^2+1. This number is the Moore bound for diameter two. The order of largest Cayley graphs of diameter two and degree d is denoted by $C(d,2)$. The only known construction of Cayley graphs of diameter 2 valid for all degrees d gives $C(d,2) > \frac{1}{4}d^2 + d$. However, there is a construction yielding Cayley graphs of diameter 2, degree d and order $d^2 - O(d^{\frac{3}{2}})$ for an infinite set of degrees d of a special type.In our talk we present a construction giving $C(d,2) \geq \frac{1}{2}d^2 - k$ for d even and of order $C(d,2)\frac{1}{2}(d^2+d) - k$ for d odd, $0 \leq k \leq 8$. In addition, we show that, in asymptotic sense, the most of record Cayley graphs of diameter two are obtained by our construction.