On groups all of whose undirected Cayley graphs of bounded valency are integral

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A finite group G is called Cayley integral if all undirected Cayley graphs over G are integral, i.e., all eigenvalues of the graphs are integers. The Cayley integral groups have been determined by Klotz and Sander [1] in the abelian case, and by Abdollahi and Jazaeri [2], and independently by Ahmady, Bell and Mohar [3] in the non-abelian case. In this talk we will generalize this class of groups by introducing the class $\mathcal{G}_k$ of finite groups G for which all graphs $\mathrm{Cay}(G, S)$ are integral if $|S| \leq k$. It will be proved that $\mathcal{G}_k$ consists of the Cayley integral groups if $k \geq 6$; and the classes $\mathcal{G}_4$ and $\mathcal{G}_5$ are equal, and consist of: (1) the Cayley integral groups, (2) the generalized dicyclic groups $\mathrm{Dic}(E_{3^n} \times \mathbb{Z}_6)$, where $n \geq 1$.

References

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