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The intersection graph of a finite simple group has diameter at most 5. (English)

Summary: Let $G$ be a non-abelian finite simple group. In addition, let $\Delta_G$ be the intersection graph of $G$, whose vertices are the proper non-trivial subgroups of $G$, with distinct subgroups joined by an edge if and only if they intersect non-trivially. We prove that the diameter of $\Delta_G$ has a tight upper bound of 5, thereby resolving a question posed by R. Shen [Czech. Math. J. 60, No. 4, 945–950 (2010; Zbl 1208.20022)]. Furthermore, a diameter of 5 is achieved only by the baby monster group and certain unitary groups of odd prime dimension.

MSC:
05C25 Graphs and abstract algebra (groups, rings, fields, etc.)
20E32 Simple groups
20D30 Series and lattices of subgroups
20D08 Simple groups: sporadic groups

Keywords:
intersection graph; simple group; subgroups

Software:
Magma

Full Text: DOI

References:

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