

Local actions in arc-transitive graphs

In this talk I'll give a partial (but possibly complete) answer to a question asked by Pierre-Emmanuel Caprace at the Groups St Andrews conference at Birmingham (UK) in August 2017, and investigated at the Tutte Centenary Retreat in Australia in November 2017.

Caprace asked if there exists a 2-transitive permutation group P such that only finitely many simple groups act arc-transitively on a symmetric graph X with local action P (of the stabiliser of a vertex v on the neighbourhood of v).

Some evidence is given to suggest that the answer is "No", even when "2-transitive" is replaced by "transitive". Indeed this will definitely be the answer if a highly likely conjecture about faithful quotients of amalgamated free products of groups is valid. Then by way of illustration, I'll answer a follow-up question by showing that all but finitely many alternating groups have such an action on a 6-valent symmetric graph with vertex-stabiliser A_6 .

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