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Graphs with r-friendship property

For $r \geq 1$, a graph has r-friendship property if every pair of vertices has exactly r common neighbours. The motivation for this definition is from the Friendship theorem, which is on the graphs with 1-friendship property. The Friendship theorem, first proved by Erdős, Rényi, and Sós in 1966, states that if G is a graph in which every pair of vertices has exactly one common neighbour, then G has a universal vertex v adjacent to all others, and the graph induced by $V(G) \setminus \{v\}$ is a matching. In this presentation, we study graphs with r-friendship property, where $r \geq 2$. We show all such graphs are strongly regular. Furthermore, we prove that for any $r \geq 2$, there are only finitely many graphs with r-friendship property. This is an ongoing joint work with Karen Gunderson.