On the Friendship Theorem

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Abstract

The Friendship theorem states that if any two people in a party have exactly one common friend, then there exists a politician who is everybody’s friend. In this presentation we generalize the Friendship theorem. Let $\lambda$ be any non-negative integer and $\mu$ be any positive integer. Suppose each pair of friends has exactly $\lambda$ common friends and each pair of strangers has exactly $\mu$ common friends in a party. The corresponding graph is a generalization of strongly regular graphs by relaxing the regularity property on vertex degrees. We prove that either everyone has exactly the same number of friends or there exists a politician who is everybody’s friend.