The Nova Graph: An Improvement to the Alternating Group Graph

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Abstract

Suppose we have k pairs of vertices $(s_1, t_1), (s_2, t_2), \ldots, (s_k, t_k)$ and we wish to find k disjoint paths; each path connecting exactly one pair. If in a graph G we can do this for any k pairs of vertices then we say that G has the k-disjoint path property. In 1999, Cheng and Lipman showed that the Split-Star Graph has the $(n-1)$-disjoint path property. In this talk we present a new structure called A_4^+, or the Nova graph. This graph has as its vertex set the even permutations on n symbols. Two vertices may be connected via the operators $(123), (132), (124), (142)$ and $J = (12)(34)$. We discuss the properties of this Cayley graph and outline a proof that A_4^+ has the 3-Disjoint Path Property.