

Coherent configuration of type $AK(2)$ on 16 points and its mergings.

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Abstract:

Recently Muzychuk, following ideas of Wallis and Fon-Der-Flaass, introduced a new wide class of coherent configurations, which provide a large amount of mergings, leading to association schemes.

We consider a particular case of such WFDF configurations, which are denoted by $AK(n)$. Any configuration of type $AK(n)$ contains $n+2$ fibers, each of size n^2 .

We investigate the unique (up to isomorphism) configuration of type $AK(2)$ and its corresponding coherent algebra W . We construct groups of usual, color, and algebraic automorphisms of W and classify with respect to these groups all homogeneous and all algebraic coherent subalgebras of W . A special attention is paid to twins, that is to pairs of algebraically isomorphic, but not combinatorially isomorphic association schemes.

In such manner we provide an unified explanation for a number of known and new phenomena related to coherent configurations of order 16.