On the Classification of 3-Dimensional Flag-Transitive Planes

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Abstract

All known finite flag-transitive planes admit a translation complement containing a linear cyclic subgroup which either acts regularly on the points of the line at infinity or has two orbits of equal size on these points. Using a connection with perfect Baer subplane partitions of $PG(2, q^2)$, the classification of odd order three-dimensional flag-transitive affine planes admitting a cyclic regular action on the line at infinity was completed by the work of several authors. In this talk we consider the odd order case where the translation complement has two point orbits of equal size on the line at infinity. Assuming the translation complement is of one of these two types, we show that all such flag-transitive planes are known. This is joint work with Gary Ebert, Craig Culbert, and Ron Baker.