ISOMORPHISMS OF GROUPS RELATED TO FLOCKS

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ABSTRACT. The most fruitful way to construct finite generalized quadrangles is through the detection of Kantor families in the general 5-dimensional Heisenberg group $\mathscr{H}_5(q)$ over some finite field $\mathbb{F}_q$. All these examples are so-called "flock quadrangles". In 1989, Payne constructed from the Ganley flock quadrangles the new Roman quadrangles, which appeared not to arise from flocks, but still via a Kantor family construction (in some group $\mathscr{G}$ of the same order as $\mathscr{H}_5(q)$). The fundamental question then arose as to whether $\mathscr{H}_5(q) \cong \mathscr{G}$. Eventually the question was solved in [1, 2]. Payne's Roman construction appears to be a special case of a far more general one: each flock quadrangle for which the dual is a translation generalized quadrangle gives rise to another generalized quadrangle which is in general not isomorphic, and which also arises from a Kantor family. Denote the class of such flock quadrangles by $\mathscr{C}$.
Recently, we resolved the question of Payne for the complete class $\mathscr{C}$ by observing that flock quadrangles are characterized by their groups.

In this talk, we will elaborate on this result and its implications.

REFERENCES

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[2] G. HAVAS, C. R. LEEDHAM-GREEN, E. A. O'BRIEN AND M. C. SLATTERY. Certain Roman and flock generalized quadrangles have nonisomorphic elation groups, *Adv. Geom.* **26** (2006), 389–396.

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