THE UNIVERSITY **OF HONG KONG**

Institute of Mathematical Research
Department of Mathematics

Geometry Seminar

A Geometric Proof of a Theorem on Antiregularity of Generalized Quadrangles

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Abstract

In design theory, in particular the study of incidence structures, characterizations of the classical examples play a basic role in the development of classification results as well as the linkage of various incidence geometries.

In the special case of a generalized quadrangle of order s, one of the oldest combinatorial characterization results is that of $\mathcal{W}(s)$, namely, that a generalized quadrangle of order $s > 1$ is isomorphic to $\mathcal{W}(s)$ if and only if all of its points are regular. The dual of $\mathcal{W}(s)$ is $\mathcal{Q}(4, s)$, the points and lines of the parabolic quadric in $PG(4, s)$, and $\mathcal{Q}(4, s)$ is self dual if and only if s is even. When s is odd, all points of $\mathcal{Q}(4, s)$ are antiregular. Whether the converse is true, namely, a generalized quadrangle of (odd) order $s > 1$ is isomorphic to $\mathcal{Q}(4, s)$ if all of its points are antiregular, is an open problem.

Remarkably, in their study on the dimensions of the binary codes of certain generalized quadrangles, Bagchi, Brouwer and Wilbrink(1991) have proven that if a generalized quadrangle of order s has an antiregular point, then all of its points are antiregular. Since the proof of the result is in terms of codes, the question has been raised as to whether a geometric proof can be given. In this talk we shall provide a proof using Laguerre geometry.

Date:	January 25, 2011 (Tuesday)
Time:	3:00 – 4:00pm
Place:	Room 210, Run Run Shaw Bldg., HKU

All are welcome