

Meeting: 1005, Newark, Delaware, SS 5A, Special Session on Designs, Codes, and Geometries

1005-05-119 **Yury J Ionin*** (yury.ionin@cmich.edu), Department of Mathematics, Central Michigan University, Mt. Pleasant, MI 48859. *Generalized Conference Matrices of Index One.*

A generalized conference matrix of index 1 over a multiplicative group G of order $n - 1$ is a matrix $S = [s_{ij}]$ of order $n + 1$ with $s_{ii} = 0$ and $s_{ij} \in G$, whenever $i \neq j$, satisfying the following condition: for any distinct $h, i \in \{1, 2, \dots, n + 1\}$ and for any $x \in G$, there exists $j \in \{1, 2, \dots, n + 1\}$ such that $s_{ij} = xs_{hj}$. We will discuss relations between generalized conference matrices, finite geometries, and difference sets. As an application, we obtain a short proof of the following case of the Prime Power Conjecture: if a projective plane of even order n is $((\infty), [\infty])$ -transitive and $((0), [0])$ -transitive and the group of all $((0), [0])$ -homologies is abelian, then the group of all $((\infty), [\infty])$ -elations is elementary abelian and n is a power of 2. (Received February 03, 2005)