Otto-von-Guericke-Universität Magdeburg
Fakultät für Mathematik

Auf Einladung des Institutes für Algebra und Geometrie spricht

Herr Prof. Dr. Ismael Gutierrez Garcia

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über das Thema

t-Graph over finitely generated Groups and grid Codes

Zoom-Koordinaten: Meeting ID: 951 9966 2620 / Passcode: 461614

Zeit: Mittwoch, 1. September 2021, 11.00 Uhr

Zu diesem Vortrag laden wir alle Interessierten herzlich ein.

Prof. Dr. Alexander Pott

Abstract: Let G be a finitely-generated group with generating set $M = \{g_1, \dots g_n\}$. Then G consists of all products $g_{i_1}^{\epsilon_1} \dots g_{i_k}^{\epsilon_k}$, with $k \in \mathbb{N}, i_j \in \{1, \dots, n\}$, and $\epsilon_i \in \mathbb{Z}$. If M has n elements, then G is said to be a n-generator group or in this context a group of length n. Suppose now that every element in $g \in G$ can be uniquely written as $g = \prod_{i=1}^{n} g_i^{\epsilon_i}$. To determine a measure of the separation between two elements of G we introduce the following distance map $d_1 : G \times G \to \mathbb{N}_0$, defined by

(0.1)
$$d_1(g,h) = d_1\left(\prod_{i=1}^{n} g_i^{\epsilon_i}, \prod_{i=1}^{n} g_i^{\delta_i}\right) = \sum_{i=1}^{n} |\epsilon_i - \delta_i|.$$

The set G endowed with this distance d is a metric space. Note that d_1 is just the Minkowski l_p metric for $p = 1$. Using the Minkowski distance, we can define a criteria for the adjacency in an undirected graph $\mathcal{G}$ having the group G as the underlying set of vertices. The t-graph of G is defined as de paar $\mathcal{G} = (G, E)$, where the set $\{g, h\} \in E$ if and only if $d_1(g, h) = t$. On the other hand, we can define a new version of group codes. A grid code $\mathcal{C}$ is a subset of G, if $\mathcal{C}$ is subgroup of G, then it is said that $\mathcal{C}$ is a group code. The elements of $\mathcal{C}$ are called codewords. The minimum distance d of a code $\mathcal{C}$ is defined as usually, that is, as the smallest distance between any two different elements of $\mathcal{C}$. Let $\mathcal{C}$ be a code of G with minimum distance d. Then we say that $\mathcal{C}$ is a $(n, |\mathcal{C}|, d)$-code over G and $(n, |\mathcal{C}|, d)$ are its parameters. In this talk, we consider such graphs and codes, and we prove some classical results on block codes.

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