UNIVERSITY OF AVEIRO
Department of Mathematics

Complex and Hypercomplex Analysis

SEMINAR
on
COMPLEX AND HYPERCOMPLEX ANALYSIS

Sala Sousa Pinto (2^o piso), Departamento de Matemática

02/07/2019, 11:00

Finding generating sets of finite groups using their Cayley graphs

Tanakorn Udomworarat
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In this talk we indicate relationships between Cayley graphs and algebraic structures of a group. We study connections between components of the Cayley graph $\mathrm{Cay}(G, A)$, where A is a subset of a group G, and cosets of the subgroup of G generated by A. We prove that any component of Cayley graph $\mathrm{Cay}(G, A)$, where G is a group and $A \subseteq G$, is a subgraph induced by a coset of the subgroup generated by A. Therefore, the number of components in Cayley graph $\mathrm{Cay}(G, A)$ is equal to the number of cosets of the subgroup generated by A. Moreover, we show how to construct generating sets of G if $\mathrm{Cay}(G, A)$ has finitely many components. Furthermore, we provide an exotic greedy algorithm for finding minimal generating sets of finite groups.

The algebra of gyrogroups: From groups to gyrogroups

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A gyrogroup is a group-like algebraic structure modeled on Einstein's velocity addition law of the special theory of relativity. In this talk, we illustrate how groups and gyrogroups relate. In particular, we show that several well-known theorems in the theory of groups can be extended to gyrogroups in a natural way. We will state versions of the isomorphism theorems, Cayley's theorem, and Lagrange's theorem for gyrogroups.

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