TEXAS ★ STATE UNIVERSITY ®

Department of Mathematics Colloquium

The average character degree of finite groups

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Abstract: A representation of degree n of a group G is a way to represent elements in G by n x n invertible matrices in such a way that the rule of group operation corresponds to matrix multiplication. The character afforded by a representation is a function on the group which associates to each group element the trace of the corresponding matrix and therefore it carries the essential information about the representation in a more condensed form. The degree of a character is exactly the degree of the representation affording it. There is no doubt that degree is the most important piece of information in a character and, therefore, character degrees are key tools to study the structure of finite groups.

In character theory of finite groups, a natural and important question is: what can the character degrees of a finite group say about the structure of the group? Or in other words, how much information regarding the structure of a group can be determined from its character degrees? We will present some recent results in this line of research. In particular, we will discuss the connection between the average character degree and several important characteristics of finite groups such as solvability, nilpotency, and p-nilpotency. This talk is accessible to undergraduates.