Classifying Prime Character Degree Graphs

For a group *G*, one can construct its corresponding prime character degree graph associated to *G*, denoted Δ(*G*). In this graph Δ(*G*), which is simple, the vertices are all the prime numbers which divide the characters of *G*, and there is an edge between two vertices p and q if there exists some character of *G* so that pq divides it. So given a group *G*, it's rather easy to construct Δ(*G*) The much more interesting question is to start with a graph Γ, and conclude whether or not there exists some group *G* so that Δ(*G*) = Γ. In this talk, we will discuss the research done on concluding which graphs can or cannot occur as the prime character degree graph of some solvable group. This will include both looking at families of graphs, as well as graphs with a small number of vertices. Both have been studied extensively in their own way, and not only have great and recent landmark results, but also have accessible open questions worthy of investigation.

By Jacob Laubacher

Jacob (Jake) Laubacher is an associate professor of mathematics at St. Norbert College. His research interest lies in algebra, and his favorite courses to teach involve theory and proof. He juggles two ongoing projects, the first focusing on the realm of homological algebra in which he studies generalizations and properties of Hochschild (co)homology. The other project exists in the world of group theory in which he investigates whether certain graphs can occur as the prime character degree graph of a solvable group.

When he's not teaching math courses, Laubacher enjoys running, knitting, and reading. He's also an avid fan of both the Oxford comma and the Cleveland Browns. He's obsessed with card games, desserts, and quality furniture.

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