On character degrees of finite groups and some associated graphs

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Let $G$ be a finite group. We define the character degree set of $G$, $cd(G)$, to be the set of all character degrees of $G$, that is, \{\chi(1) : \chi \in \text{Irr}(G)\}$, where $\text{Irr}(G)$ is the set of all complex irreducible characters of $G$.

While studying the character degree set of a finite group $G$, it is useful to attach some graph structure on $cd(G)$. In this talk, we introduce some strongly related undirected graphs associated with $cd(G)$ and present some interesting results that reflect the strong interplay between the combinatorial properties of these graphs and the structure of $G$. 