TUTTE UNIQUE GRAPHS

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Abstract. The Tutte polynomial $T(G; x, y)$ of a graph G encapsulates many important graph properties including the number of spanning trees and spanning subgraphs. Many important graph polynomials are partial evaluations of the Tutte polynomial including the chromatic polynomial which counts the number of proper vertex colourings of a graph, the flow polynomial which counts the number of nowhere zero flows in a graph, and the reliability polynomial which gives the probability of a graph becoming disconnected under random edge failure.

Any graph polynomial that is a specialisation of the Tutte polynomial can be calculated using deletion/contraction operations. A graph G is *Tutte-unique* if $T(G; x, y) = T(H; x, y) \to G \sim H$. There exist non-isomorphic graphs that have the same Tutte polynomial. However, Bollobas, Peabody and Riordan (2000) conjectured that almost all graphs are Tutte-unique. Although, some families of graphs are known to be Tutte-unique, there is no known general method to determine if a given graph G is Tutte-unique.

In a recent project, we investigated properties of Tutte-unique grarphs by examining the minors obtained by deleting or contracting a single edge which we call a *deck*. In this talk, we compare the decks of Tutte-unique and non-Tutte-unique multigraphs and present some of our initial findings.

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