A TUTTE POLYNOMIAL FOR EMBEDDED GRAPHS

IN COLLABORATION WITH IAIN MOFFATT

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Abstract. The Tutte polynomial is a widely used graph invariant that captures a lot of the combinatorial information about a graph. In recent years, several extensions of the Tutte polynomial to graphs cellularly embedded in surfaces have appeared, one of the most recent being a polynomial by Goodall, Litjens, Regts and Vena that can count the number of local flows and tensions of an embedded graph. The significance of such a polynomial should be clear when one considers Tutte's original work with the dichromate of a graph and how that laid the foundation for his polynomial. However, for a polynomial to truly behave like an extension of the Tutte polynomial we would expect it to also have a recursive formula.

In this talk, I show how extending to the family of non-cellularly embedded graphs in pseudo-surfaces facilitates a recursive formula for the Goodall, Litjens, Regts and Vena polynomial. I hope to convey why this is the natural family of embedded graphs to consider in order to preserve the topology of the surface under edge deletion and contraction. Finally, I will show that this extension also provides a method for recursively obtaining the number of local flows and tensions.

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