PORTED PARAMETRIZED TUTTE FUNCTIONS: OLD AND NEW APPLICATIONS

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It is natural and useful to perform Tutte decomposition with one or more "port" elements distinguished so they are not deleted or contracted, or are deleted or contracted after all others. Suppose also that parameters, representing say probability, electrical resistance or conductance, or edge sign in a planar graph associated to a knot or link diagram by the medial construction, etc., are attached to elements and indecomposibles. We first review and extend conditions given by Zaslavsky, Bollobás-Riordan, Ellis-Monaghan-Traldi, and Diao-Hetyei for a parametrized ported Tutte function to be well-defined. We then give applications to graphs. We also report how these methods may apply to the conjecture of Grimmett-Winker, Kahn and Pemantle that the occurances of two given edges in random spanning forest subgraphs are negatively correlated. The methods include a function of two graphs that obeys ported parametrized Tutte identities in each variable, and a combinatorial formula for the correlation conjectured by Wagner.

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