

RELATIVE TUTTE POLYNOMIALS OF TENSOR  
PRODUCTS OF COLORED GRAPHS

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**Abstract**

The tensor product  $(G_1, G_2)$  of a graph  $G_1$  and a pointed graph  $G_2$  (containing one distinguished edge) is obtained by identifying each edge of  $G_1$  with the distinguished edge of a separate copy of  $G_2$ , and then removing the identified edges. A formula to compute the Tutte polynomial of a tensor product of graphs was originally given by Brylawski. This formula was recently generalized to colored graphs and the generalized Tutte polynomial introduced by Bollobás and Riordan. In this paper we generalize the colored tensor product formula to relative Tutte polynomials of relative graphs, containing zero edges to which the usual deletion-contraction rules do not apply. As we have shown in a recent paper, relative Tutte polynomials may be used to compute the Jones polynomial of a virtual knot.

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