1078-57-300 **Yuanan Diao***, Department of Mathematics, UNC Charlotte, 9201 University City Blvd, Charlotte, NC , and **Gabor Hetyei**. *Relative Tutte polynomials of tensor products of colored graphs.* Preliminary report.

The tensor product operation associates a pair of graphs (G_1, G_2) to a graph $G_1 \otimes G_2$, which is obtained by replacing each edge of G_1 with a copy of G_2. The Tutte polynomial of such a tensor product of graphs is shown (by Brylawski) to be obtainable from the Tutte polynomials of G_1 and G_2 through some variable substitutions. This has been shown that Brylawski's formula can be extended to the case where G_1 and G_2 are colored graphs and the tensor product is generalized in such a way that only some edges in G_1 (marked by a certain color λ) need to be replaced by copies G_2. Motivated by graphs arising from the virtual knot theory, we have recently introduced a generalized Tutte polynomial (called a relative Tutte polynomial) for graphs with colored edges and a special kind of edges (called zero edges) that cannot be treated as the regular colored edges in the computation of the Tutte polynomial. We generalize the tensor product formula for colored graphs to the relative Tutte polynomial for colored relative graphs. This generalization is highly nontrivial and is only similar to the previously known formulas in spirit. The rules of substitutions are also more complicated due to the complexity of the relative Tutte polynomial. (Received December 12, 2011)