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Kyle A Miller* (kmill@berkeley.edu). *A 2D TQFT approach to topological graph polynomials and graphs in thickened surfaces.* Preliminary report.

Many invariants of graphs or ribbon graphs — such as the chromatic polynomial — satisfy a deletion-contraction formula and, perhaps after a normalization factor, are multiplicative under disjoint unions and wedge sums. Such invariants are specializations of the Tutte–Whitney polynomial or, more generally, the Bollobás–Riordan polynomial. I will describe a 2D TQFT approach to such invariants and explain their classification in terms of symmetric Frobenius algebras. From this perspective, we can obtain a short graphical proof of the result of Dasbach, et al., that the Jones polynomial is the Bollobás–Riordan polynomial of a ribbon graph associated to a Turaev state surface of a link diagram.

The Yamada polynomial is a polynomial invariant of spatial graphs that also satisfies deletion-contraction, and as an application, I will discuss multivariable generalizations to ribbon graphs in thickened surfaces and virtual ribbon graphs. (Received September 15, 2020)