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Clark W Butler* (butler.552@buckeyemail.osu.edu), Department of Mathematics - OSU,
100 Math Tower, 231 West 18th Avenue, Columbus, OH 43210. *Relation between the Relative
Tutte and Bollobas-Riordan Polynomials.*

A relative plane graph is a planar graph with a distinguished subset of edges. There is a generalization of the Tutte polynomial to relative graphs. From a relative plane graph we demonstrate a construction of a graph embedded into a surface which is equivalent to a ribbon graph. We also propose an inverse construction of a relative planar graph from a planar projection of a ribbon graph. We prove a relation between the Bollobás-Riordan polynomial of the ribbon graph and the Relative Tutte polynomial of the constructed planar graph under a natural variable specialization, generalizing the relation between the Bollobás-Riordan polynomial of a planar-embeddable ribbon graph and the Tutte polynomial of its underlying graph. This specialization leads to the Kauffman bracket polynomial of a virtual link diagram, as well as a duality relation of the Relative Tutte, which generalizes the celebrated duality relation of the Tutte polynomial. (Received August 09, 2010)