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Mark Ellingham* (mark.ellingham@vanderbilt.edu). *Chmutov's generalized duality and the gem representation of embedded graphs*. Preliminary report.

In 2009 Chmutov introduced an operation of ‘generalized duality’ for graphs embedded in surfaces, where a dual is taken using only a subset of the edges. He showed that a certain specialization of the Bollobás-Riordan polynomial is invariant under this operation; this generalizes the usual duality relation for Tutte polynomials for connected planar graphs. Chmutov defined his operation in terms of ‘arrow presentations’ of embedded graphs, which are related to the usual ribbon graphs or band decompositions. With this definition it seems quite difficult to see how the structure of an embedding changes when this operation is applied. In this talk we show that Chmutov’s operation is expressed very simply in terms of the ‘gem’ (graph-encoded map) representation of embedded graphs introduced by Robertson in 1971 and investigated further by Lins and Bonnington and Little. We apply this to describe how generalized duality changes the structure of an embedding in some naturally occurring situations. (Received September 20, 2011)