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**Steven Schluchter\*** ([steven.schluchter@gmail.com](mailto:steven.schluchter@gmail.com)), Department of Mathematical Sciences, George Mason University, 4400 University Drive, MS 3F2, Fairfax, VA 22312. *Applications of ordinary voltage graph theory and intersection theory to graph embeddability.*

We will discuss the extendability of free actions of groups on graphs to embeddings of graphs in surfaces. We will make use of ordinary voltage graph embeddings, which encode the (derived) embeddings we seek in the form of algebraic data assigned to other (base) embeddings. We will develop and apply our homologically driven matrix analysis of ordinary voltage graph embeddings and the derived embeddings they encode. We will show that for each prime  $p > 5$ , the generalized Petersen graph  $GP(2p, 2)$  can be embedded in the torus, but not as a derived embedding. Furthermore, we will show that for each prime  $q > 3$ , there exists an ordinary voltage graph that has no derived embedding in the nonorientable surface of Euler characteristic  $2 - 2q$ , yet the corresponding derived graph does have an embedding in this surface. (Received September 16, 2017)