1030-94-355 **Christine A. Kelley**, Department of Mathematics, The Ohio State University, Columbus, OH 43210, and **Judy L. Walker*** (`jwalker@math.unl.edu`), Department of Mathematics, University of Nebraska, Lincoln, NE 68588-0130. *LDPC codes from voltage graphs.* Preliminary report.

Several well-known structure-based constructions of LDPC codes, for example codes based on permutation and circulant matrices and in particular quasi-cyclic LDPC codes, can be interpreted via voltage assignments. We explain the connection and show how this idea from topological graph theory can be used to give simple proofs of many known properties of these codes. We also indicate how, by using more sophisticated voltage assignments, new classes of good LDPC codes can be obtained. Finally, we suggest how this technique may be applied in the design of other classes of graph-based codes. (Received August 06, 2007)