1035-94-1334 **Judy L Walker*** (jwalker@math.unl.edu), Department of Mathematics, University of Nebraska, Lincoln, NE 68588-0130. *An application of the edge zeta function to coding theory.*

This talk will discuss an exciting connection between zeta functions of graphs and the study of error-correcting codes. One of the most important developments in coding theory over the past decade is the (re)-discovery of binary low-density parity-check (LDPC) codes. An LDPC code is defined as the kernel of a sparse matrix and comes equipped with an iterative decoding algorithm which acts on the so-called Tanner graph, a bipartite graph associated to this matrix. The local nature of this algorithm is both its greatest strength – it is extremely efficient – and its greatest weakness – it is non-optimal. In particular, graph cover pseudocodewords, which are essentially codewords in codes corresponding to finite covers of the Tanner graph, are also seen by the decoder and can therefore lead to decoder error. Hence, in order to better understand the behavior of the decoder (which will, in turn, lead to the construction of better codes), one must understand these graph-cover pseudocodewords. It turns out that the graph-cover pseudocodewords can be characterized via the edge zeta function of the Tanner graph.

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