1046-15-1807   **Chenying Wang*** (`wang_c@math.psu.edu`), 109 McAllister, State College, PA 16803. *LDPC codes and Ramanujan graphs.*

Ramanujan graphs are optimal expanders. They are sparse regular graphs with large girth. These properties make them good candidates to be used to associate LDPC codes. Rosenthal and Vontobel were the first to construct LDPC codes based on Ramanujan graphs. Recently, a family of LDPC codes called $LU(m, q)$, where q is a prime power and $m \geq 2$, was constructed by using certain q-regular bipartite graphs as Tanner graphs. In this talk we discuss the distribution of the eigenvalues of the Tanner graphs of $LU(2, q)$ and $LU(3, q)$. We showed that the largest non-trivial eigenvalue of an $LU(2, q)$ code is $\sqrt{q}$ for all q, and that of an $LU(3, q)$ code is $\sqrt{2q}$ for q odd. Therefore the Tanner graphs of $LU(2, q)$ and $LU(3, q)$ are Ramanujan graphs, and $LU(2, q)$ and $LU(3, q)$ are good LDPC codes. (Received September 16, 2008)