1056-05-313 **Wasin So*** (so@math.sjsu.edu), Department of Mathematics, San Jose State University, San Jose, CA 95192. *Non-existence of circulant expander family.* Preliminary report.

The expansion constant of a simple graph G of order n is defined as

$$h(G) = \min_{0<|S|\leq \frac{n}{2}} \frac{|E(S,\overline{S})|}{|S|}$$

where $E(S,\overline{S})$ denotes the set of edges in G between the vertex subset S and its complement $\overline{S}$. An expander family is a sequence $\{G_i\}$ of d-regular graphs of increasing order such that $h(G_i) > \epsilon$ for some fixed positive integer d and $\epsilon > 0$. Existence of such family is known in literature, but construction is non-trivial. A folklore states that there is no expander family of circulant graphs only. In this talk, we provide a simple proof of this fact by first estimating the second largest eigenvalue of a circulant graph, and then employing the Cheeger inequality. (Received August 28, 2009)