Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-05-1280 **Peter D Johnson*** (johnspd@auburn.edu), Department of Mathematics and Statistics, Auburn University, AL 36849, and **Robert E Jamison**, **Lisa Markus**, **Evan Morgan** and **Emine Yazici**. *Strongly (t,r)-regular graphs.*

A graph is strongly (t,r)-regular if and only if it is of order at least t, and for any set of t of its vertices, the union of the open neighborhoods of the vertices in the set has cardinality r. There are various "easy" examples or classes of examples of strongly (t,r)-regular graphs. For instances, a graph consisting of m independent edges is strongly (t,t)-regular for all t from 1 to 2m; the union of s isolated vertices and a clique of order r is strongly (t,r)-regular for each t from s+2 to s+r; and there are several other "easy" categories that space here does not permit the description of. Our results are of two types: conditions under which strong (t,r)-regularity occurs only in these easy circumstances (for instance, if a graph, on n vertices with no isolated vertices, is strongly (t,n-1)-regular, then t = n-1 and the graph is a union of independent edges); and results in aid of the hunt for non-easy strongly (t,r)-regular graphs. As an instance of the latter, we show that if there is a non-regular strongly (2,r)-regular graph, for some r, then r > 11. (Received October 04, 2004)