

1086-05-2345

**Nathan H Reff\*** (reff@alfred.edu), Department of Mathematics, Alfred University, Alfred, NY 14802. *Oriented Gain Graphs, Line Graphs and Eigenvalues*. Preliminary report.

A gain graph is a graph where each orientation of an edge is given a group element, which is the inverse of the group element assigned to the opposite orientation. We define line graphs of gain graphs and study some matrix properties of complex unit gain graphs. As with graphs and signed graphs, there is a relationship between the incidence matrix of a complex unit gain graph and the adjacency matrix of the line graph. The line graph of a gain graph is defined using oriented gain graphs, a new structure that generalizes Zaslavsky's oriented signed graphs and their line graphs. (Received September 25, 2012)