Meeting: 1002, Pittsburgh, Pennsylvania, SS 1A, Special Session on Invariants of Knots and 3-Manifolds

1002-05-234 **Laure Helme-Guizon*** (lhelmeg@yahoo.com), 1237 N Stuart Street, Arlington, VA 22201, and **Yongwu Rong**. *A Homology theory for graphs: From a graph, we produce a chain complex whose graded Euler Characteristic is the chromatic polynomial of the graph.* Preliminary report.

In recent years, there have been a great deal of interests in Khovanov homology theory For each link L in S^3, Khovanov defines a family of homology groups whose "graded" Euler characteristic is the Jones polynomial of L. These groups were constructed through a categorification process which starts with a state sum of the Jones polynomial, constructs a group for each term in the summation, and then defines boundary maps between these groups appropriately for each positive integer n.

It is natural to ask if similar categorifications can be done for other invariants with state sums. In this talk, we establish a homology theory that categorifies the chromatic polynomial for graphs. We show our homology theory satisfies a long exact sequence which can be considered as a categorification for the well-known deletion-contraction rule for the chromatic polynomial. This exact sequence helps us to compute the homology groups of several classes of graphs. In particular, we point out that torsions do occur in the homology for some graphs.

This is joint work with Yongwu Rong, George Washington University, Washington DC, USA (Received September 14, 2004)