1163-05-785 **Lina Fajardo Gómez**, **Margherita Maria Ferrari*** (mmferrari@usf.edu), **Nataša Jonoska** and **Masahico Saito**. *Homology of directed graphs with application to DNA recombination.* Preliminary report.

A double-occurence word (DOW) is a word in which every symbol appears exactly twice. We consider the so called repeat patterns ($\alpha\alpha$) and return patterns ($\alpha\alpha^R$), with gaps allowed between the α's; these patterns generalize square and palindromic factors of DOWs, respectively. In the context of genomics, pattern deletions on DOWs have been used to study DNA recombination in certain species of ciliates. We model these reduction processes with a directed graph where vertices are DOWs, and an edge from w to w' exists if w' is obtained from w through a pattern deletion. On this graph, we consider the cell complex consisting of products of directed simplices and define a new boundary operator. This allows the computation of homology groups, which will help in identifying rearrangement pathways that may be of interest. (Received September 12, 2020)