

TOPOLOGICAL CONNECTIVITY OF GRAPH COLORING COMPLEXES OF CERTAIN PRODUCT GRAPHS

ABSTRACT. Lovász gave a proof of Kneser conjecture in graph theory using topological methods in 1978. Since then applying topological techniques to solve problems in graph theory and combinatorics has been very fruitful. The general strategy involves first associating a simplicial complex to a graph then relate some topological property like connectivity of this complex to the graphical property like chromatic number of graph. In his proof of Kneser conjecture, Lovász associated a simplicial complex to a graph called neighborhood complex and later generalize this complex to a polyhedral complex $\text{Hom}(G, H)$ called hom complex for graphs G and H .

In this talk I shall focus on certain product graphs and their associated hom complexes. Using discrete Morse theory I will establish the topological connectivity of these complexes. In a special case we also prove that they are of same homotopy type as a sphere of certain dimension.

This is a joint work with Nandini Nilakantan.