

# The complement of a connected bipartite graph is vertex decomposable

Mohammad Mahmoudi

Islamic Azad University (IAU)

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## Abstract

Associated to a simple undirected graph  $G$  is a simplicial complex  $\Delta_G$  whose faces correspond to the independent sets of  $G$ . A graph  $G$  is called vertex decomposable if  $\Delta_G$  is a vertex decomposable simplicial complex. We are interested in determining what families of graph have the property that the complement of  $G$ , denoted by  $\bar{G}$ , is vertex decomposable. We obtain the result that the complement of a connected bipartite graph is vertex decomposable and so it is Cohen-Macaulay due to pureness of  $\Delta_{\bar{G}}$ .