Decomposition of complete bipartite digraphs and even complete bipartite multigraphs into closed trails

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Abstract

It has been showed [3] that any bipartite graph $K_{a,b}$, where a, b are even integers, can be decomposed into closed trails with prescribed even lengths. In this article we consider the corresponding question for directed bipartite graphs. We show that complete directed bipartite graph $\overleftrightarrow{K}_{a,b}$ is decomposable into directed closed trails of even lengths greater than 2, whenever these lengths sum up to the size of the digraph $\overleftrightarrow{K}_{a,b}$. We use this result to prove that complete bipartite multigraphs can be decomposed in a similar manner.