THE OPEN TRAILS IN DIGRAPHS

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The first results on the topic of arbitrarily decomposition of graphs into trails is due to Balister, who proved that if $G := K_n$ for n odd or $G := K_n - I$, where I is a 1-factor in K_n, for n even, then G is arbitrarily decomposable into closed trails ([1]). Horňák and Woźniak ([4]) showed that complete bipartite graphs $K_{a,b}$ for a, b even are also arbitrarily decomposable into closed trails. The notion of an arbitrarily decomposable graphs into closed trails graph were generalized to oriented graphs (see Balister [2] and Cichacz [3]). Balister proved a necessary and sufficient condition for complete digraph to be decomposable into directed closed trails. Whereas Cichacz ([3]) showed that complete directed graphs $\overleftrightarrow{K}_{a,b}$ are arbitrarily decomposable into closed directed trails.
In this article we consider the corresponding question for open trails. We show that complete directed graphs $\overleftrightarrow{K}_n$ and $\overleftrightarrow{K}_{a,b}$ are arbitrarily decomposable into directed open trails.

References

[1] Balister, P.N. (2001) Packing Circuits into K_N. *Combin. Probab. Comput.* **10** 463–499.

[2] Balister, P.N. (2003) Packing digraphs with directed closed trails. *Combin. Probab. Comput.* **12** 1–15.

[3] Cichacz, S. (2005) Decomposition of complete bipartite digraphs and even complete bipartite multigraphs into closed trails. *Preprint MD* **016**, `http://www.ii.uj.edu.pl/preMD/`.

[4] Horňák, M., and Woźniak M. (2003) Decomposition of complete bipartite even graphs into closed trails. *Czechoslovak Mathematical Journal* **128** 127–134.