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Hamilton decompositions of one-ended Cayley graphs

In 1984, Alspach asked whether every Cayley graph of a finite Abelian group admits a Hamilton decomposition. The conjectured answer is yes, but except in some special cases the question remains wide open.

In this talk we study an analogous question for infinite, finitely generated groups, using spanning double rays as an infinite analogue of Hamilton cycles.

We show that if G is a one-ended Abelian group and S is a generating set only containing non-torsion elements, then the corresponding Cayley graph admits a decomposition into spanning double rays. In particular, any Cayley graph of $\mathbb{Z}^d$ has such a decomposition. Related results for two-ended groups will also be discussed.

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