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Decidability and periodicity of translational tilings.

Let G be a finitely generated abelian group, and F_1, \dots, F_J be finite subsets of G . We say that F_1, \dots, F_J tile G by translations, if G can be covered by translated copies of F_1, \dots, F_J , without any overlaps.

Given some finite sets F_1, \dots, F_J in G , can we decide whether they admit a tiling of G ? Suppose that they do tile G , do they admit a periodic tiling? A well known argument of Hao Wang ('61), shows that these two questions are closely related. In the talk, we will discuss this relation, and present some results, old and new, about the decidability and periodicity of translational tilings, in the case of a single tile ($J = 1$) as well as in the case of a multi-tileset ($J > 1$). (Received August 28, 2021)