1110-03-336 **Edward W. Krohne*** (`edwardkrohne@my.unt.edu`), General Academics Building 435, 1155 Union Circle #311430, Denton, TX 76201. *The Twelve Tiles Theorem and Consequences for $F(2^{\mathbb{Z}^2})$.*

We present a novel theorem of Borel Combinatorics that sheds light on the types of continuous functions that can be defined on the graph of $F(2^{\mathbb{Z}^2})$. The topological space $F(2^{\mathbb{Z}^2})$ embeds into the Cantor space 2^ω and has a natural free continuous $\mathbb{Z}^2$ action. Considering the graph induced by this action, we obtain a disjoint union of uncountably many Cayley graphs of $\mathbb{Z}^2$. It is folklore that no continuous (indeed, Borel) function provides a chromatic two-coloring of $F(2^{\mathbb{Z}^2})$, despite the fact that any finite part of $F(2^{\mathbb{Z}^2})$'s graph is bipartite. The Twelve Tiles Theorem offers a much more complete analysis of continuous functions on this space. That is, we construct a sequence of finite graphs $(\Gamma_n)_{n\in\omega}$, each consisting of twelve "tiles", such that for *any* property P (such as "chromatic two-coloring") that is locally recognizable in the proper sense, a continuous function with property P exists on $F(2^{\mathbb{Z}^2})$ iff a function with a corresponding property P' exists on some Γ_n. We present the theorem, and give several applications. (Received February 24, 2015)