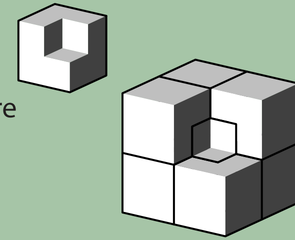
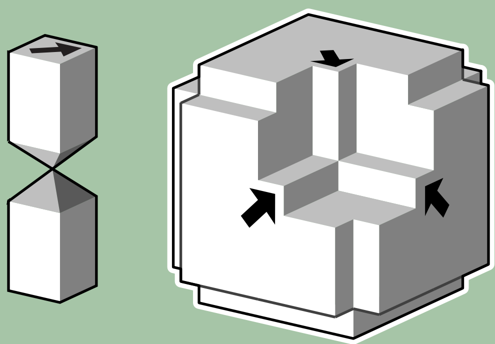
An aperiodic pair of tiles in E^n, n≥3

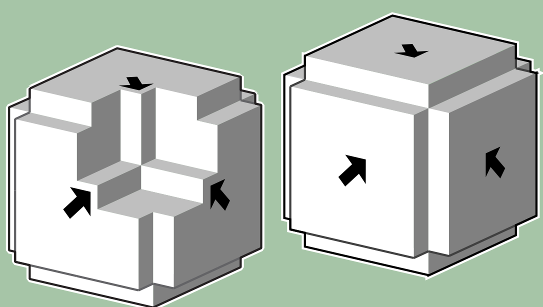
C Goodman-Strauss



The construction is based on the n-dimensional "chair" or "L" substitution. The tiles are essentially higher dimensional versions of the trilobite and cross tiles in the plane.

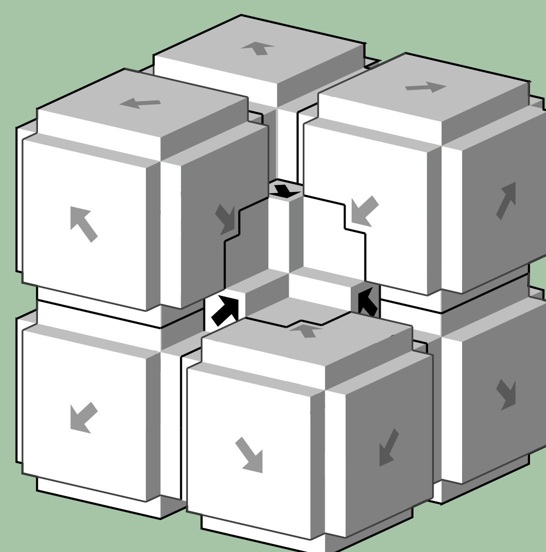


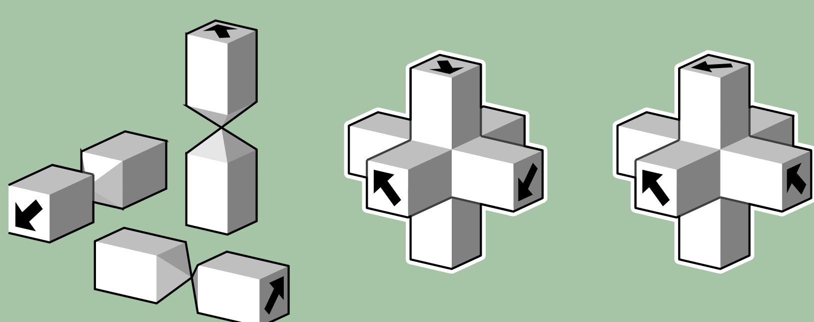
The two three-dimensional tiles are shown at left. The higher dimensional tiles are analogous. These two tiles can tile E^n, but only in a way that replicates the non-periodic structure of the n-dimensional chair substitution tilings. Consequently, the two tiles are aperiodic.



The larger tile is of course based on the chair tile. The markings serve to orient neighboring tiles (and neighboring supertiles) in order to form larger and larger chair supertiles.

The markings of the central tile of each supertile are, in effect, the markings of the supertile itself. These are propogated to the boundary of the supertile by the obelisk tiles.





The obelisk tiles effectively transmit markings between supertiles at all levels of the substitution hierarchy. They are designed so that these transmissions can cross one another unimpeded.

For more details of the proof and construction, please see:

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