Abstract of the Master thesis Reptile simplices

Zuzana Safernová

In the present work we study tetrahedral *k*-reptiles. A *d*-dimensional simplex is called a *k-reptile* if it can be tiled in *k* simplices with disjoint interiors that are all congruent and similar to *S*. For *d=2*, triangular *k*-reptiles exist for many values of *k* and they have been completely characterized. On the other hand, the only simplicial *k*-reptiles that are known for *d>=3* have $k=m^d$, where *m>=2* (*Hill simplices*).

We prove that for *d=3*, tetrahedral k-reptiles exist *only* for $k=m^3$. This partially confirms the Hertel's conjecture, asserting that the only tetrahedral *k*-reptiles are the Hill tetrahedra. We conjecture that *k = m^d* is necessary condition for existence of *d*-dimensional simplicial *k*-reptiles, *d > 3*.