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 = md, where m  2 (Hill simplices).
We prove that for d = 3, tetrahedral k-reptiles exist only for k = m3. This partially confirms the Hertel's conjecture, asserting that the only tetrahedral k-reptiles are the Hill tetrahedra. We conjecture that k = md is necessary condition for existence of d-dimensional simplicial k-reptiles, d > 3.