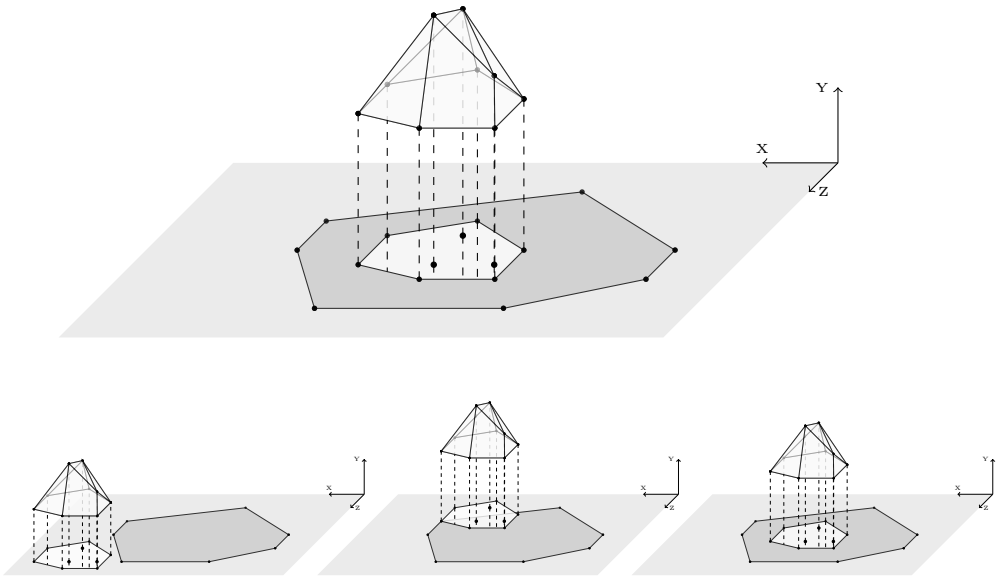
Projecting of an N dimensional polytope onto a $N-1$ dimensional polytope

Andreas Orthey

We will visualize here the three different ways of how the projection of a 3-d polytope p onto a 2-d polytope q can affect the topology of the q. The three cases are: I) p is not intersecting q and does not change the topology, II) p is intersecting the q and the boundary of q, but is not changing the topology of the q, and III) p cuts a hole into q changing the topology of q.



(a) Polytope does not intersect walkable surface: No change

(b) Polytope intersects, but not all vertices are inside the interior of the walkable surface: We need to split the walkable surface, to get a convex decomposition.

(c) Polytope intersects and all vertices are inside the interior of the walkable surface: We need to split the surface, and the topology of the trajectory classes changes.