Affine unfoldings of convex polyhedra

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Abstract:

A well-known problem in geometry which may be traced back to the Renaissance artist Albrecht Durer is concerned with cutting a convex polyhedral surface along some spanning tree of its edges so that it may be isometrically embedded into the plane. We show that this is always possible after an affine transformation of the surface. In particular, unfoldability of a convex polyhedron does not depend on its combinatorial structure, which settles a problem of Croft, Falconer, and Guy. Among other techniques, the proof employs a topological characterization for embeddings among immersed planar disks.