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Degenerating brick manifolds and subdividing the associahedron

The associahedron is a convex polytope which pops up all over mathematics. Loday gave a realization of the associahedron as a lattice polytope; Loday's associahedron has subsequently been understood as an example of a brick polytope. Brick polytopes are defined from subword complexes and they give polytopal realizations of certain subword complexes. Escobar associated to each subword complex a smooth sub-variety of a Bott-Samelson variety, which she called a brick manifold, and she showed that the brick polytope is the moment polytope of the brick manifold. In particular, Escobar constructed the toric variety of Loday's associahedron as a brick manifold. We describe a degeneration of any brick manifold and show that in the special case of the toric variety of the associahedron, the degeneration induces a polyhedral subdivision of the associahedron into cubes.

This is joint work with Raj Gandhi.