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Varieties related to toric degenerations of spherical varieties

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Abstract

Batyrev *et. al.* constructed a family of Calabi-Yau varieties using small toric degenerations of the full flag variety G/B . They conjecture this family to be mirror to generic anti-canonical hypersurfaces in G/B . Recently Alexeev and Brion, as a part of their work on toric degenerations of spherical varieties, have constructed many degenerations of G/B . For any such degeneration we construct a family of varieties, which we prove coincides with Batyrev's in the small case. We prove that any two such families are birational, thus proving that mirror families are independent of the choice of degeneration. The birational maps involved are closely related to Berenstein and Zelevinsky's geometric lifting of tropical maps to maps between totally positive varieties.