

Bruhat atlases, on wonderful compactifications of groups and elsewhere
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Let M be a smooth projective variety with a stratification by subvarieties, and define a Bruhat atlas on it to be an open covering by copies of Bruhat cells (in some fixed flag manifold), where each identification $U \leftrightarrow BvB/B$ is a stratified isomorphism.

As yet, this is a theory of examples: $M = G/B$ where the subvarieties are the Richardson varieties (Schubert intersect opposite Schubert), $M = G/P$ where they're the projections of Richardson varieties, and M the wonderful compactification of an adjoint group. The latter two require the Bruhat cells to come from a Kac-Moody (not affine) flag manifold.

The combinatorial side requires identifying the poset of strata with an order ideal in a Bruhat order. I'll give an M for which this is impossible, and discuss what computational tools would be useful for generalizing the framework beyond smooth M .

This is joint work with Xuhua He and Jiang-Hua Lu.