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On the Reductive Monoid Associated to a Parabolic Subgroup

Let G be a connected reductive group over a perfect field k . We study a certain normal reductive monoid \overline{M} associated to a parabolic k -subgroup P of G . The group of units of \overline{M} is the Levi factor M of P . We show that \overline{M} is a retract of the affine closure of the quasi-affine variety $G/U(P)$. Fixing a parabolic P^- opposite to P , we prove that the affine closure of $G/U(P)$ is a retract of the affine closure of the boundary degeneration $(G \times G)/(P \times_M P^-)$. Using idempotents, we relate \overline{M} to the Vinberg semigroup of G . The monoid \overline{M} is used implicitly in the study of stratifications of Drinfeld's compactifications of the moduli stacks Bun_P and Bun_G .

Keywords: Reductive monoid, affine embedding of homogeneous space, boundary degeneration, Vinberg semigroup.

MSC: 14M17, 14R20, 20M32