Matrix-Ball Construction of affine Robinson-Schensted correspondence

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Abstract

In his study of Kazhdan-Lusztig cells in affine type A, Shi has introduced an affine analog of Robinson- Schensted correspondence. We generalize the Matrix-Ball Construction of Viennot and Fulton to give a more combi- natorial realization of Shi's algorithm. As a biproduct, we also give a way to realize the affine correspondence via the usual Robinson-Schensted bumping algorithm. Next, inspired by Honeywill, we extend the algorithm to a bijection between extended affine symmetric group and triples (P, Q, ρ) where P and Q are tabloids and ρ is a dominant weight. The weights ρ get a natural interpretation in terms of the Affine Matrix-Ball Construction. Finally, we prove that fibers of the inverse map possess a Weyl group symmetry, explaining the dominance condition on weights.

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