Chaotic and Periodic Behavior of Jeu de Taquin on Infinite Young Tableaux

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Young tableaux play a central role in combinatorics and representation theory, with operations such as promotion and jeu de taquin providing deep links to geometry, symmetry, and dynamics. While these operations are well understood in the finite setting, their behavior on infinite tableaux remains largely unexplored outside probabilistic models. This paper initiates a systematic study of jeu de taquin slides (jdt) on infinite tableaux from a combinatorial and dynamical perspective. We examine how jdt acts on infinite shapes, identify structures exhibiting periodic, pre-periodic, and recurrent behavior, and show that the jdt map is chaotic in the sense of Devaney. These results extend classical tableau theory into the infinite realm and suggest new links between combinatorial dynamics and asymptotic representation theory.

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