

1056-05-1585

Richard Ehrenborg* (jrge@ms.uky.edu), Department of Mathematics, Lexington, KY 40506-0027, and **JiYoon Jung** (jjung@ms.uky.edu), Department of Mathematics, Lexington, KY 40506-0027. *Extension of the d -divisible partition lattice.*

For a composition \vec{c} of n we introduce a subposet $\Pi_{\vec{c}}$ of the partition lattice Π_{n+1} . Our work on this extension is motivated by enumerative results of Richard Stanley and topological results of Michelle Wachs on the d -divisible partition lattice, which corresponds to the composition $(d, \dots, d, d-1)$. We show the Möbius function of $\Pi_{\vec{c}}$ is given by $\beta(\vec{c})$, that is, the number of permutations of \mathfrak{S}_n with descent composition \vec{c} . Moreover, the poset $\Pi_{\vec{c}}$ has an EL -labeling, hence its order complex is a wedge of $\beta(\vec{c})$ spheres. We describe the cycles in the top homology and show they are homeomorphic to the barycentric subdivision of a Cartesian product of root polytopes. We also describe the representation of the symmetric group \mathfrak{S}_n acting on the top homology. (Received September 22, 2009)