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## $\$h\$$ -Vectors of Generalized Associahedra and Noncrossing Partitions

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# ***h*-VECTORS OF GENERALIZED ASSOCIAHEDRA AND NONCROSSING PARTITIONS**

CHRISTOS A. ATHANASIADIS, THOMAS BRADY, JON MCCAMMOND,  
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ABSTRACT. A uniform proof is given that the entries of the  $h$ -vector of the cluster complex  $\Delta(\Phi)$ , associated by S. Fomin and A. Zelevinsky to a finite root system  $\Phi$ , count elements of the lattice  $\mathbf{L}$  of noncrossing partitions of corresponding type by rank. Similar interpretations for the  $h$ -vector of the positive part of  $\Delta(\Phi)$  are provided. The proof utilizes the appearance of the complex  $\Delta(\Phi)$  in the context of the lattice  $\mathbf{L}$  in recent work of two of the authors, as well as an explicit shelling of  $\Delta(\Phi)$ .

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