1053-05-177 **Gábor Hetyei*** (ghetyei@uncc.edu), Department of Mathematics and Statistics, UNC-Charlotte, Charlotte, NC 28223-0001, and **Christian Krattenthaler** (christian.krattenthaler@univie.ac.at), Fakultät für Mathematik, University of Vienna, Nordbergstraße 15, A-1090 Vienna, Austria. *The Möbius function of the poset of bipartitions.*

Bipartitional relations were introduced by Foata and Zeilberger, who showed these are precisely the relations which give rise to equidistribution of the associated inversion statistic and major index. In this talk we consider the natural partial order on bipartitional relations given by inclusion, and explain why the Möbius function of every interval is 0, 1, or -1. We achieve this goal by engaging in a deeper topological study of the order complex of this partially ordered set. We will see that bipartitional relations on a set of size n form a graded lattice of rank $3n-2$. The order complex of this lattice is homotopy equivalent to a sphere of dimension $n-2$. Each proper interval in this lattice has either a contractible order complex, or it is isomorphic to the direct product of Boolean lattices and smaller lattices of bipartitional relations. The main tool in the proofs of these results is discrete Morse theory as developed by Forman, and an application of this theory to order complexes of graded posets, designed by Babson and Hersh.

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