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40506. *The Rees product of the cubical lattice with the chain.* Preliminary report.

In recent work, Björner and Welker connect concepts from commutative algebra with poset topology. One such poset construction is the Rees product. Some very beautiful combinatorics is emerging from this construction. For example, Jacob Jonsson settled a conjecture of Björner and Welker that the Möbius function of the Rees product of the Boolean algebra B_n with the chain on n elements is given by the n th derangement number. Shareshian and Wachs have studied the poset homology of the order complex of this poset. In this talk we study enumerative and homological properties of the Rees product of the cubical lattice with the chain. Up to a sign the Möbius function is given by n times the permanent of an $(n - 1) \times (n - 1)$ square matrix having 1's on the diagonal and 2's elsewhere. We are also considering homological questions for the order complex of this poset. (Received February 10, 2008)