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The Malvenuto-Reutenauer Hopf Algebra of Permutations

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The Solomon descent algebra of the symmetric group is a sub-Hopf algebra of an algebra of permutations introduced by Malvenuto and Reutenauer. This algebra may be seen as a non-commutative version of the algebra of quasi-symmetric functions, and has applications to enumerative combinatorics.

This talk will describe the structure of this Malvenuto-Reutenauer Hopf algebra in detailed combinatorial terms. This description is obtained through careful analysis of the weak Bruhat order on the symmetric groups and their subsets of shuffles.

This is joint work with Marcelo Aguiar.