

# THE ANTIPODE PROBLEM FOR HOPF MONOIDS IN THE CATEGORY OF SPECIES

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A Hopf monoid (in Joyal's category of species) is an algebraic structure akin to that of a Hopf algebra. Combinatorial structures which compose and decompose give rise to Hopf monoids. The antipode of a Hopf monoid encodes information of combinatorial interest. We will discuss the antipode problem and solve it for some concrete Hopf monoids, including those of simple graphs and of generalized permutahedra. This is joint work with Federico Ardila and Swapneel Mahajan.