

# Hopf algebras on planar trees and permutations

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## **Abstract**

We endow the space of rooted planar trees with the structure of a Hopf algebra. We prove that variations of such a structure lead to Hopf algebras on the spaces of labeled trees,  $n$ -Trees, increasing planar trees and sorted trees. These structures are used to construct Hopf algebras on different types of permutations. In particular, we obtain new characterizations of the Hopf algebras of Malvenuto-Reutenauer and Loday-Ronco via planar rooted trees. © 2022 World Scientific Publishing Company.

## **Author keywords**

Hopf algebras; infinitesimal bialgebras; permutations; trees