



A multivariate hook formula for labelled trees

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Several hook summation formulae for binary trees have appeared recently in the literature. In this paper we present an analogous formula for unordered increasing trees of size r , which involves r parameters. The right-hand side can be written nicely as a product of linear factors. We study two specializations of this new formula, including Cayley's enumeration of trees with respect to vertex degree. We give three proofs of the hook formula. One of these proofs arises somewhat indirectly, from representation theory of the symmetric groups, and in particular uses Kerov's character polynomials. The other proofs are more direct, and of independent interest.

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