

# Representations of quantum permutation algebras

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We develop a combinatorial approach to the quantum permutation algebras, as Hopf images of representations of type  $\pi: A_s(n) \rightarrow B(H)$ . We discuss several general problems, including the commutativity and cocommutativity ones, the existence of tensor product or free wreath product decompositions, and the Tannakian aspects of the construction. The main motivation comes from the quantum invariants of the complex Hadamard matrices: we show here that, under suitable regularity assumptions, the computations can be performed up to  $n=6$ .

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