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Characters and chromatic symmetric functions. (English) Zbl 1464.05355

Summary: Let $P$ be a poset, $\text{inc}(P)$ its incomparability graph, and $X_{\text{inc}(P)}$ the corresponding chromatic symmetric function, as defined by R. P. Stanley in [Adv. Math. 111, No. 1, 166–194 (1995; Zbl 0831.05027)]. Let $\omega$ be the standard involution on symmetric functions. We express coefficients of $X_{\text{inc}(P)}$ and $\omega X_{\text{inc}(P)}$ as character evaluations to obtain simple combinatorial interpretations of the power sum and monomial expansions of $\omega X_{\text{inc}(P)}$ which hold for all posets $P$. Consequences include new combinatorial interpretations of the permanent, induced trivial character immanants, and power sum immanants of totally nonnegative matrices, and of the sum of elementary coefficients in the Shareshian-Wachs chromatic quasisymmetric function $X_{\text{inc}(P),q}$ when $P$ is a unit interval order.

MSC:
05E05 Symmetric functions and generalizations
05C15 Coloring of graphs and hypergraphs
15A15 Determinants, permanents, traces, other special matrix functions
20C08 Hecke algebras and their representations
06A07 Combinatorics of partially ordered sets

Keywords:
Shareshian-Wachs chromatic quasisymmetric function

Full Text: DOI

References: