

1135-11-1262

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Polynomial Splitting Measures and Cohomology of the Pure Braid Group.

Work of the second author and Benjamin L. Weiss (2015) studied the probability of particular factorization types of monic square-free polynomials of degree n over the finite field F_q . These probabilities are labeled by partitions of n , so define class functions on the symmetric group S_n . It showed these probabilities on each class interpolate in the parameter q to rational functions of q that are Laurent polynomials. The second author (J. Number Theory 2016) found that at $q = 1$ rescaled versions of these probabilities had a representation theoretic meaning as characters of an explicitly described representation of S_n . The present work (Arnold Math. J. 2017) studies the individual coefficients in the Laurent polynomials and shows they also have a representation-theoretic interpretation. The coefficients are each given to a subrepresentation of the S_n - action acting on a particular cohomology group of the pure braid group. The results were discovered by computer experiments. (Received September 20, 2017)