Asymptotic normality of the distribution of q-derangement numbers for the wreath product $C_r \wr \mathfrak{S}_n$

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Abstract

We present in this work results on the distribution of the flag major index of random derangements from the wreath product $C_r \wr \mathfrak{S}_n$. We compute the mean, variance and moment generating function, and prove the asymptotic normality, of the distribution. The results presented generalize and unify the recent results due to Chen and Wang.