

A Carlitz identity for the wreath product $C_r \wr \mathfrak{S}_n$

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摘 要：

A flag major index fmaj_r for the wreath product $G_{r,n} = C_r \wr \mathfrak{S}_n$ is presented, where C_r is the cyclic group of order r and $\mathfrak{S}_n$ is the symmetric group on n letters. The flag major index fmaj_r enjoys the property that it is equidistributed with the length function on $G_{r,n}$ and the generating function of the pair $(\text{des}_r, \text{fmaj}_r)$ over $G_{r,n}$ satisfies a “natural” Carlitz identity, where des_r is the usual descent number on $G_{r,n}$. The natural Carlitz identity unifies earlier results due to Carlitz (when $r = 1$), and Chow and Gessel (when $r = 2$).