Research

Colloquium

The sorting index on Coxeter groups and complex reflection groups

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摘　要：

The sorting indices on Coxeter groups of type A, B and D are defined by Petersen and it is proved that they are all Mahonian. Recently, Petersen's result was extended by Chen-Gong-Guo to a series of joint equidistributions of set-valued statistics and by Poznanović to the set of restricted permutations corresponding to the arrangements of non-attacking rooks on a fixed Ferrers shape.

In the first part of this talk, we will extend above results to complex reflection group of type $G(r,1,n)$, denoted by $\mathsf{G}_{r,n}$ for short. We define a new statistic sor on $\mathsf{G}_{r,n}$ and prove that it has the same distribution as the length function. For the set of restricted elements corresponding to the arrangements of n non-attacking rooks on a fixed Ferrers shape we show that the following two sequences of set-valued statistics are joint equidistributed: $(\ell, \mathsf{Rmil}^0, \mathsf{Rmil}^1, \ldots, \mathsf{Rmil}^{r-1}, \mathsf{Lmil}^0, \mathsf{Lmil}^1, \ldots, \mathsf{Lmil}^{r-1}, \mathsf{Lmal}^0, \mathsf{Lmal}^1, \ldots, \mathsf{Lmal}^{r-1}, \mathsf{Lmap}^0, \mathsf{Lmap}^1, \ldots, \mathsf{Lmap}^{r-1})$ and $(\mathsf{sor}, \mathsf{Cyc}^0, \mathsf{Cyc}^{r-1}, \ldots, \mathsf{Cyc}^1, \mathsf{Lmic}^0, \mathsf{Lmic}^{r-1}, \ldots, \mathsf{Lmic}^1, \mathsf{Lmal}^0, \mathsf{Lmal}^1, \ldots, \mathsf{Lmal}^{r-1}, \mathsf{Lmap}^0, \mathsf{Lmap}^1, \ldots, \mathsf{Lmap}^{r-1})$. In the second part, analogous results are obtained for permutations of multisets and the minimal length representatives for quotients of parabolic subgroups.