

Repetição de geradores em palavras reduzidas

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Generators of S_n

$$\{\sigma_1, \dots, \sigma_{n-1}\} \subset S_n$$

$$\sigma_i := [1, \dots, i+1, i, \dots, n]$$

$$\begin{cases} \sigma_i^2 = e \\ \sigma_i \sigma_j = \sigma_j \sigma_i & |i-j| \geq 2 \\ \sigma_i \sigma_{i+1} \sigma_i = \sigma_{i+1} \sigma_i \sigma_{i+1} \end{cases}$$

$$\text{Example } [4, 3, 1, 2] = \sigma_1 \sigma_2 \sigma_1 \sigma_2 \sigma_3 \sigma_2 \sigma_1 \in S_n$$

Reduced decompositions

$$w = \sigma_2 \sigma_3 \sigma_2 \sigma_1 \sigma_2$$

$$l(w) = 5$$

$$R(w) =$$

$$\{\sigma_2 \sigma_3 \sigma_2 \sigma_1 \sigma_2, \sigma_3 \sigma_2 \sigma_3 \sigma_1 \sigma_2, \sigma_3 \sigma_2 \sigma_1 \sigma_3 \sigma_2, \sigma \sigma_3 \sigma_1 \sigma_2 \sigma_1, \sigma_2 \sigma_1 \sigma_3 \sigma_2 \sigma_1\}$$

σ_k	$\min_k(w)$	$\max_k(w)$
σ_1	1	2
σ_2	2	3
σ_3	1	2

321 and 3412 patterns

$$q = [5, 2, 7, 3, 4, 1, 6]$$

$$[5, 2, 1] \quad [5, 3, 1]$$

$$[5, 4, 1] \quad [7, 3, 1]$$

$$[7, 4, 1] \quad [5, 7, 3, 4]$$

References

- A. Björner, F. Brenti, Combinatorics of Coxeter Groups, Graduate Texts in Mathematics, vol. 231, Springer, New York, 2005.
- Bridget Eileen Tenner. The range of repetition in reduced decompositions. Adv. in Appl. Math., 122:Paper No. 102107, 16, 2021.
- C. Gaetz, Y. Gao, P. Jiradilok, G. Nenashev, A. Postnikov, Repeatable patterns and the maximum multiplicity of a generator in a reduced word, arXiv:2204.03033v2, 2024