

MATH-F-421 students

# Coxeter groups

Course notes

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### Part I Coxeter groups

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## Part I

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### Coxeter groups



## Introduction

This chapter is based on the first chapter of [MKS04].

We recall in group theory that a group  $(G, \cdot)$  is a non-empty set  $G$  of elements with a binary operation  $\cdot$  for which the next for axioms are satisfied:

- **Closure:** For all  $a, b \in G$ ,  $c$  such that  $a \cdot b = c$  implies that  $c \in G$ .
- **Associativity:** The operation  $\cdot$  is associative, which means that for any elements  $a, b, c \in G$ :

$$(ab)c = a(bc)$$

- **Identity element:** There exists an element of  $G$  noted 1 for which:

$$a \cdot 1 = 1 \cdot a = a$$

- **Inverse element:** For any  $a \in G$  there exists an *element*  $a^{-1}$  for which:

$$a \cdot a^{-1} = a^{-1} \cdot a = 1$$

There are some ways to generate groups:

### 1.1 Presentation of groups





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## References

- [MKS04] Wilhelm Magnus, Abraham Karrass, and Donald Solitar. *Combinatorial Group Theory: Presentations of Groups in Terms of Generators and Relations*. Dover Publications, Mineola, NY, unabridged and unaltered republication of the 2. rev. dover ed edition, 2004. OCLC: 254445530.