

Abstract Algebra

WANG SIBO

November 10, 2022

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Preliminary

1. Matrix

Definition 0.1 (elementary matrix).

Definition 0.2 (orthogonal matrix).

Definition 0.3 (nilpotent matrix).

Definition 0.4 (idempotent matrix).

Group

1. Basic

Definition 1.1 (group).

Proposition 1.2 (2nd definition).

Proposition 1.3 (3rd definition).

Definition 1.4 (order of group).

Definition 1.5 (order of an element in group).

Definition 1.6 (permutation group).

Notation 1.7. S_n permutation group

Definition 1.8 (cyclic group).

2. Subgroup & Coset

Definition 1.9 (subgroup).

Notation 1.10. $H \leq G$ subgroup

Proposition 1.11 (intersection of subgroups is still a subgroup).

Definition 1.12 (center).

Definition 1.13 (subgroup generator).

Notation 1.14 (representation of subgroup generated by a subset).

Theorem 1.15 (representation of subgroup generated by a subset).

Theorem 1.16 (every cyclic group can be generated by a singleton subset).

Warning 1.17. Infinite group can be generated by a finite subset.

Example 1.18. $(\mathbb{Z}, +) = \langle \{1\} \rangle$

Theorem 1.19 (order of the group which is generated by a singleton subset is the same as the order of the element).

Bibliography