

# Notes of "Quotient Space"

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## 1 Overview

- Rmk: The motivation of the quotient space is to define a subspace which is naturally isomorphic to any complemented subspace of a subspace
- Def: The quotient space of a vector space by a subspace
  - Rmk: The operations defined on  $V/W$  is well-defined, i.e. do not depend on the choice of representatives
- Thm: The isomorphism between the quotient space of a vector space by a subspace and a complemented subspace
- Cor: The relation between the dimensions of a vector space, a subspace, and a complemented subspace of the subspace