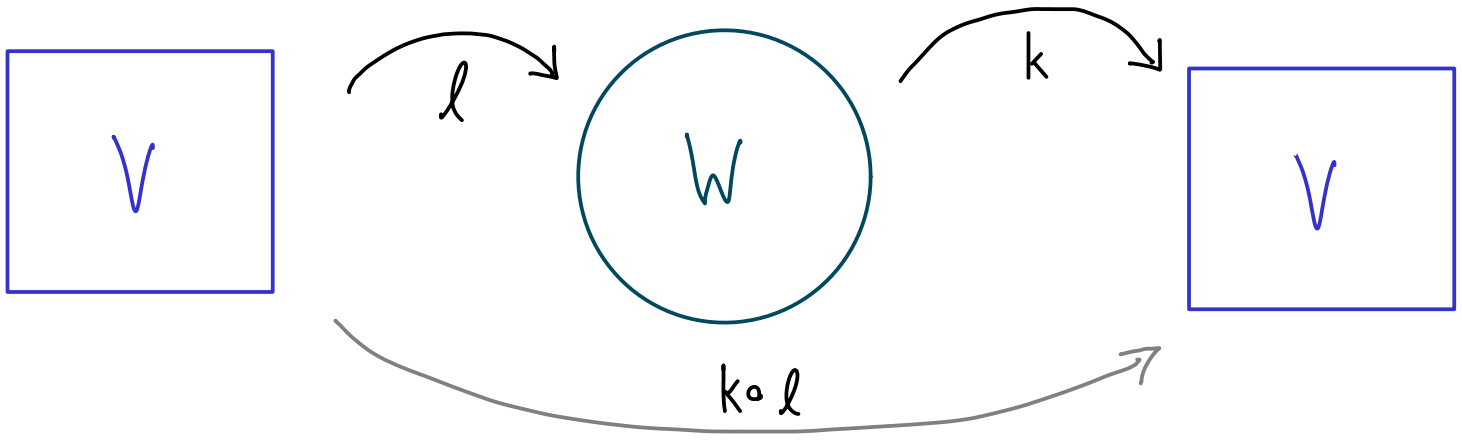
Abstract Linear Algebra – Part 24

$\ell: V \longrightarrow W$ linear map preserves the structure of the vector space.

(vector space) homomorphism



Reminder: (just maps on sets) $f: V \longrightarrow W$ is called invertible if there is a map

$g: W \longrightarrow V$ with $g \circ f = \mathrm{id}_V$ and $f \circ g = \mathrm{id}_W$

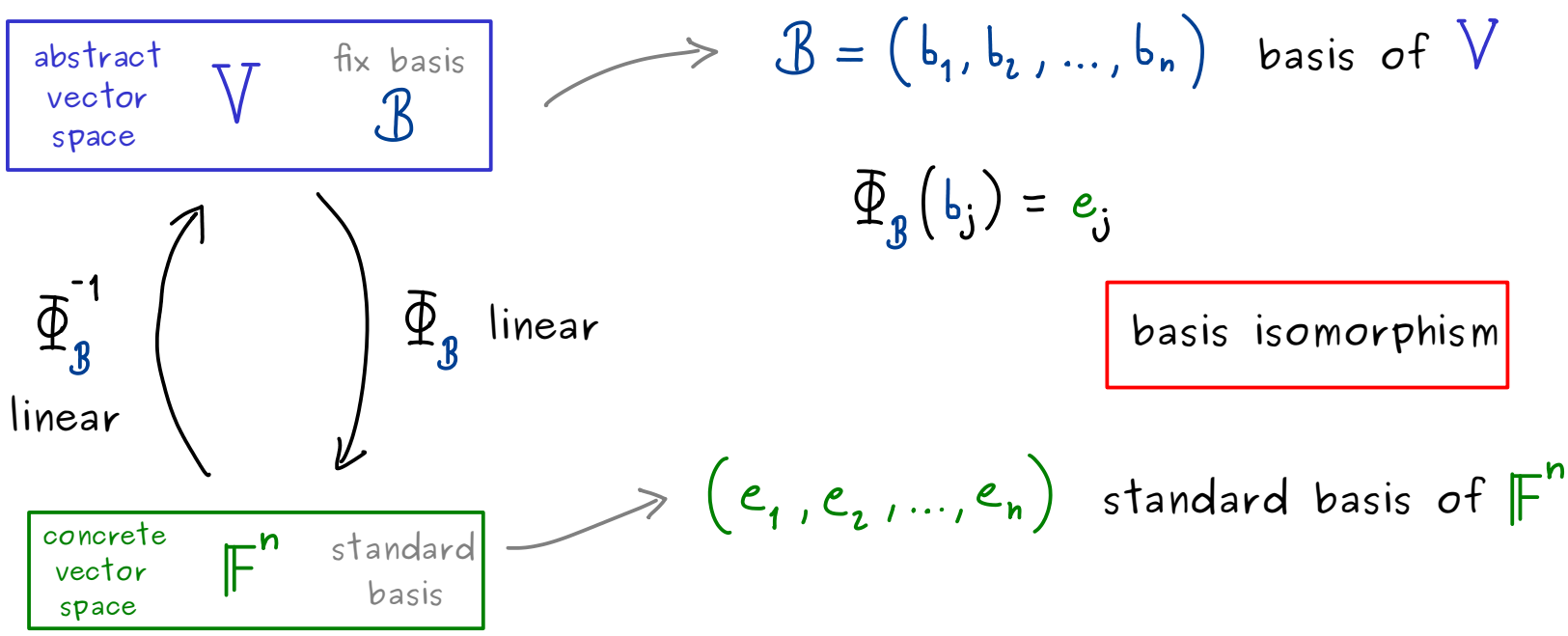
denoted by f^{-1}

f bijective $\Longleftrightarrow$ f invertible

Fact: $\ell: V \longrightarrow W$ linear + bijective $\Longrightarrow$ $\ell^{-1}: W \longrightarrow V$ linear

(see part 31 in "Linear Algebra")

Example:



Definition: $f: V \longrightarrow W$ homomorphism + $f^{-1}: W \longrightarrow V$ homomorphism

$\rightsquigarrow$ is called an isomorphism

Remember: (vector space) isomorphism $=$ bijective linear map

$=$

linear isomorphism