title: Premier Proof Presentation: Axler 1.C.12
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1 | Lemma

Prove that the union of two subspaces of V is a subspace of V if and only if one of the subspaces is contained in the other.

#incomplete … this got deleted? I guess see KBe20math530PremierProofPresentation-export.pdf

2 | Working it out

Axler 1.C ex 12 on 12 Sep 2020

A, B subV: Union of A, B is subV iff $A \cup B = A$ or $A \cup B = B$

↳ directly shows union is a subspace, because A and B are already subspaces

Now, assume $A \cup B$ is a subspace:

thus, it must be closed under addition. if they were not contained one w/in other, assume $a \in A$, $b \in B$, $a \notin B$, $b \notin A$

$\Rightarrow a+b \in A \cup B$ (subspace closed) $\therefore a+b \in A$ or $a+b \in B$

if $a+b \in A$ then $b = \cancel{A}\,(a+b) + (-a) \in A \therefore b \in A$ contradiction