

Source:

1 | **TODO construct and write proof for Axler 2.C ex 17**

2 | **Problem**

Prove or give a counterexample:

$$\begin{aligned}\dim(U_1 + U_2 + U_3) \\ &= \dim U_1 + \dim U_2 + \dim U_3 \\ &\quad - \dim(U_1 \cap U_2) - \dim(U_1 \cap U_3) - \dim(U_2 \cap U_3) \\ &\quad + \dim(U_1 \cap U_2 \cap U_3)\end{aligned}$$

3 | **Reasoning**

By Axler 2.41 we know that

$$\dim(U_1 + U_2) = \dim U_1 + \dim U_2 - \dim(U_1 \cap U_2)$$