Math 4242 Homework 2

(1) Let V be a vector space over $\mathbb{F}$, and $v_1, \cdots, v_n \in V$. Show that $\mathrm{span}(v_1, \cdots, v_n)$ is the smallest subspace of V that contains all of $v_1, \cdots, v_n$.

(2) Let V be a vector space, and $U_1, \cdot, U_m$ subspaces of V. Prove that
$$\mathrm{span}(U_1 \cup \cdots \cup U_m) = U_1 + \cdots + U_m$$

(3) Prove that $\mathrm{span}(v_1, \cdots, v_n) = \mathrm{span}(v_1) \oplus \cdots \oplus \mathrm{span}(v_n)$ if and only if $v_1, \cdots, v_n$ are linearly independent.

(4) OS 2.1.12

(5) OS 2.1.13

(6) OS 2.2.29

(7) OS 2.3.3

(8) OS 2.3.18

(9) OS 2.4.22

(10) OS 2.4.27

(11) ~~OS 3.1.9~~

(12) ~~OS 3.1.17~~

Optional (do not submit)

- 2.4.23
- 2.4.27
- 3.1.27