Source:

1 | product of vector spaces def

Suppose $V_1, \ldots, V_m$ are vector spaces over $\mathbb{F}$

- The *product* $V_1 \times \cdots \times V_m = \{(v_1, \ldots, v_m) : v_1 \in V_1, \ldots, v_m \in V_m\}$
- Addition on $V_1 \times \cdots \times V_m$ is defined as

$$(u_1, \ldots, u_m) + (v_1, \ldots, v_m) = (u_1 + v_1, \ldots, u_m + v_m)$$

- Scalar multiplication on $V_1 \times \cdots \times V_m$ is defined by

$$\lambda(v_1, \ldots, v_m) = (\lambda v_1, \ldots, \lambda v_m)$$

1.1 | careful

1.1.1 | product of multiple vector spaces (not just two)

1. similar to how sums/direct sums are not just sums of a pair but rather sums of a list