

**Source:**

## **1 | sum of a vector and a subspace def**

1.1 | **for  $v \in V$  and  $U \subset V$ ,  $v + U = \{v + u : u \in U\}$  (aka shift everything by  $v$ )**

## **2 | affine subset, parallel def**

2.1 | **an affine subset of  $V$  is a subset of  $V$  that is "shifted" by a vector in  $V$**

2.2 | **all affine subsets from a subspace are said to be parallel to that subspace**

## **3 | quotient space def**

3.1 | **A quotient space  $V/U$  where  $U \subset V$  is the set of affine subsets parallel to  $U$  (all shifts)**

3.2 | **result**

3.2.1 | **two affine subsets parallel to  $U$  are equal or disjoint (Axler3.85)**

1. intuition

(a) if they are 'parallel', then they must be equal (inf intersection) or disjoint (zero intersection)