# [LA] Linear Algebra Learnings 2020-02-03~09

### What is a subspace?

All the possible points/area the linear combinations of the column vectors can reach.

Linear subspace = a set, a linear combination should result into still being in that set.

Subspace rule:

1. Any linear combination of an element of the subspace should be still in the subspace.
2. Must pass through 0/origin.
   1. A line or plane must pass through the origin.
   2. A set of solutions cannot be a subspace if it does not include a 0-vector/matrix in it's solution.

## Given: Ax = b

### What is a column space?

A subspace of the linear combinations of the column vectors.

Can also be described as all the possible space/vectors, matrix A can solve for. In other words, all the possible vector-b matrix-A can transform into.

### What is a null space?

If b = 0, all the possible solutions matrix-x can be.