

Worksheet 7 - 11/17

1. Is the union of two subspaces always a subspace? If not, give a counterexample.
2. Is the intersection of two subspaces always a subspace? If not, give a counterexample.
3. Let's compute a determinant using gaussian elimination. Let

$$A = \begin{bmatrix} 2 & -1 & 2 \\ 2 & -1 & 1 \\ 0 & 3 & 1 \end{bmatrix}$$

We will determine what row operations do to the determinant of a matrix.

- (a) What is $\det(A)$?
- (b) What is the effect of swapping two rows of a matrix on the determinant? Try swapping the first two rows of A and computing the determinant of the resulting matrix.
- (c) What is the effect of scale multiplying a row of a matrix on the determinant? Try scale multiplying the 2nd row of A by 2 and computing the determinant of the resulting matrix.
- (d) What is the effect of adding a multiple a row to another row on the determinant? Try adding twice the first row to the second and computing the determinant of the resulting matrix.
- (e) Use these ideas to compute the determinant of A using gaussian elimination. If you are stuck, see the following links:

- https://en.wikipedia.org/wiki/Gaussian_elimination#Computing_determinants
- <https://math.stackexchange.com/questions/714974/determinant-by-applying-gaussian-elimination>