MA2.101 Linear Algebra
Spring'24

Assignment 7

Deadline: 22^{nd} February, 11:59pm

Instructions:

1) This assignment consists of 2 problems. All problems are compulsory.
2) Mention all assumptions while answering the questions.
3) Be clear in your arguments. Vague arguments shall not be given full credit.
4) Only Handwritten Submissions are allowed. Scan and upload it on moodle.

Problems:

1. Let V and W be vector spaces over the field F and let T be a linear transformation from V into W. Suppose that V is finite-dimensional.Then prove that:

$$rank(T) + nullity(T) = dimV.$$

2. Let V be an n-dimensional vector space over the field F and let W be an m-dimensional vectorspace over F. Then the space $L(V, W)$ is finite-dimensional and has dimension mn. Formally, prove that:

$$dimL(V, W) = dim(V) \times dim(W)$$