

Introduction.

Notation, Definitions & Basic notions. We introduce here basic notations that we will be using throughout this part. Large parts are taken from standard literature inspired by Matrix Computations by golub2013matrix, and Probability: Theory & Examples by Rick durrett2019probability. Norms and Inner Product definition[Euclidean Norm] Let $\|\cdot\|_E : \mathbb{R}^d \rightarrow [0, \infty)$ denote the Euclidean norm defined for all $d \in \mathbb{N}$ and $x = \{x_1, x_2, \dots, x_d\} \in \mathbb{R}^d$ as: $\|x\|_E = \sqrt{\sum_{i=1}^d x_i^2}$ ¹²