

Exercises

E11.32 [10X] Prerequisites: [(11.14)]. We equip \mathbb{R}^n with the norm $\|x\|_\infty$: show that in dimension 2 the disk $\{x \in \mathbb{R}^n, \|x\|_\infty \leq 1\}$ is a square, and in dimension 3 it is a cube, *etc etc*.

Now we equip \mathbb{R}^n with the norm $\|x\|_1$: show that in dimension 2 the disk $\{x \in \mathbb{R}^n, \|x\|_1 \leq 1\}$ is a *rhombus* i.e. precisely a square rotated 45 degrees; and in dimension 3 the disk is an octahedron.