Thm. $|u,v| \le \|u\| \|v\|$

Pf $(u+\alpha v, u+\alpha v)$

$= \|u\|^2 + 2(u,v)\alpha + \alpha^2 \|v\|^2 \ge 0$

$\Rightarrow D = (u,v)^2 - \|u\|^2 \|v\|^2 \le 0$

$\Rightarrow \|u\| \|v\| \ge |(u,v)|$

Thm. $\|u+v\| \le \|u\| + \|v\|$

Def. The distance $d(u,v)$ between vectors u and v in $\mathbb{R}^n$ is defined by $d(u,v) = \|u-v\|$

ex. $u = \begin{bmatrix} \sqrt{2} \\ 1 \\ -1 \end{bmatrix}$, $v = \begin{bmatrix} 0 \\ 2 \\ -2 \end{bmatrix}$

$d(u,v) = \sqrt{\sqrt{2}^2 + 1^2 + 1^2} = \sqrt{4} = 2$