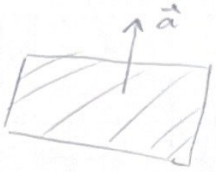
✓3) Prove a hyperplane is a convex set



plane $a^T x = c \; \forall x \in \mathbb{R}^n$

$S = \{ x \in \mathbb{R}^n \mid a^T x = c \}$

$a^T x_1 = c$ ——— (1)
$a^T x_2 = c$ ——— (2)

$x_1, x_2 \in S$

$\lambda x_1 + (1-\lambda) x_2 \overset{\text{set}}{=} \vec{x}$

$a^T(\lambda x_1 + (1-\lambda) x_2) = c$?

$\lambda a^T x_1 + (1-\lambda) a^T x_2 = c$? ——— (3)

sub (1) & (2) in (3)

$\lambda c + (1-\lambda) c = c$

✓

✓ hyperplane is a convex set.