

$$(ab)x = a(bx) \quad \forall x \in F^n, a, b \in F$$

$$\begin{aligned}(ab)x &= (ab)(x_1, \dots, x_m) \\&= (abx_1, \dots, abx_m) \\&= (a(bx_1), \dots, a(bx_m)) \\&= a(bx)\end{aligned}$$

□