

$$A = Id$$

$$\sigma_{A_{ii}} = 1$$

$$A = \lambda Id$$

$$\sigma_{A_{ii}} = \lambda$$

$$\text{cond}(A) = 1$$

$$A_n = \begin{pmatrix} 1 & 0 \\ 0 & \frac{1}{n} \end{pmatrix}$$

$$\text{cond}(A_n) = n$$