$$A = \begin{pmatrix} 100 & 99 \\ 99 & 98 \end{pmatrix}$$

$$A^{-1} = \begin{pmatrix} -98 & 99 \\ 99 & -100 \end{pmatrix}$$

$$\|A\|_\infty = 199$$

$$\|A^{-1}\|_\infty = 199$$

$$\text{cond}(A)_\infty = \|A^{-1}\| \, \|A\|_\infty = 39601$$

$$A^T A = \begin{pmatrix} 19801 & 19602 \\ 19602 & 19405 \end{pmatrix}$$

$$\lambda_1 = 39205.9997$$

$$\lambda_2 = 0.000025504$$

$$\text{cond}(A)_2 = \|A^{-1}\|_2 \, \|A\|_2$$

$$= \sqrt{\frac{\lambda_{max}(A^T A)}{\lambda_{min}(A^T A)}} = 39203.9954$$