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Condition number of e^x

1. What is the approximate condition number for evaluating function $f(x) = e^x$?
2. How large is $f(x)$ when the approximate condition number is 10^8?

Solution: 1.

$$\begin{bmatrix} x_{11} & x_{12} & x_{13} & \cdots & x_{1n} \\ x_{21} & x_{22} & x_{23} & \cdots & x_{2n} \\ & & \cdots\cdots\cdots\cdots & & \\ x_{d1} & x_{d2} & x_{d3} & \cdots & x_{dn} \end{bmatrix} = \begin{bmatrix} x_{11} & x_{12} & x_{13} & \cdots & x_{1n} \\ x_{21} & x_{22} & x_{23} & \cdots & x_{2n} \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ x_{d1} & x_{d2} & x_{d3} & \cdots & x_{dn} \end{bmatrix}$$

2. If $cond = 10^8$ then we will have $x = 10^8$ or $x = -10^8$.

In the case that $x = 10^8$, then $f(x) = e^{10^8} = e^{80}$.

In the case that $x = -10^8$, then $f(x) = e^{-10^8} = e^{-80}$

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