

$$\begin{aligned}
 b - A\tilde{x} &= \begin{bmatrix} \frac{1}{63} \\ \frac{1}{168} \end{bmatrix} - \begin{bmatrix} \frac{1}{2} & \frac{1}{3} \\ \frac{1}{3} & \frac{1}{4} \end{bmatrix} \begin{bmatrix} 0.142 \\ -0.66 \end{bmatrix} \\
 &= \begin{bmatrix} \frac{1}{63} \\ \frac{1}{168} \end{bmatrix} - \begin{bmatrix} 9.0157 \\ 0.500583 \end{bmatrix} \\
 &= \begin{bmatrix} 0.000173 \\ 0.00017 \end{bmatrix}
 \end{aligned}$$

$$\Rightarrow \|b - A\tilde{x}\| = 0.000173$$

$$\Rightarrow K(A) = \frac{\|b - A\tilde{x}\|}{\|A\|_\infty} = \frac{(50)(0.000173)}{(5/6)} = 0.0104$$

$$\underline{b.} \quad 3.9x_1 + 1.6x_2 = 5.5$$

$$6.8x_1 + 2.9x_2 = 9.7$$

$$x = (1, 1)^T$$

$$\tilde{x} = (0.98, 1.1)^T$$

$$\|x - \tilde{x}\| = \max\{0.02, 0.1\} = 0.1$$

$$\begin{aligned}
 b - A\tilde{x} &= \begin{bmatrix} 5.5 \\ 9.7 \end{bmatrix} - \begin{bmatrix} 3.9 & 1.6 \\ 6.8 & 2.9 \end{bmatrix} \begin{bmatrix} 0.98 \\ 1.1 \end{bmatrix} \\
 &= \begin{bmatrix} -0.082 \\ -0.154 \end{bmatrix}
 \end{aligned}$$

$$\Rightarrow \|b - A\tilde{x}\|_\infty = 0.154$$

$$\|A\|_\infty = 9.7$$

$$\Rightarrow K(A) = \frac{\|b - A\tilde{x}\|_\infty}{\|A\|_\infty} = \frac{0.154}{9.7} = 0.0158$$