Step-1

Suppose, $A=\begin{bmatrix}2 & -1\\ -1 & 2\end{bmatrix}$

Then,

$$I-A=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}-\begin{bmatrix}2 & -1\\ -1 & 2\end{bmatrix}$$
$$=\begin{bmatrix}-1 & 1\\ 1 & -1\end{bmatrix}$$

Step-2

Let the initial value of x be $x_0=(p_0,q_0)$ and general value of x be given by $x_k=(p_k,q_k)$. For the sake of convenience, let $b=(0,0)$. Thus, we have

$$x_{k+1}=(I-A)x_k$$

Therefore,

$$x_1=\begin{bmatrix}-1 & 1\\ 1 & -1\end{bmatrix}\begin{bmatrix}p_0\\ q_0\end{bmatrix}$$
$$=\begin{bmatrix}-p_0+q_0\\ p_0-q_0\end{bmatrix}$$
$$x_2=\begin{bmatrix}-1 & 1\\ 1 & -1\end{bmatrix}\begin{bmatrix}-p_0+q_0\\ p_0-q_0\end{bmatrix}$$
$$=\begin{bmatrix}2p_0-2q_0\\ -2p_0+2q_0\end{bmatrix}$$

$$x_3=\begin{bmatrix}-1 & 1\\ 1 & -1\end{bmatrix}\begin{bmatrix}2p_0-2q_0\\ -2p_0+2q_0\end{bmatrix}$$
$$=\begin{bmatrix}-4p_0+4q_0\\ 4p_0-4q_0\end{bmatrix}$$
$$x_4=\begin{bmatrix}-1 & 1\\ 1 & -1\end{bmatrix}\begin{bmatrix}-4p_0+4q_0\\ 4p_0-4q_0\end{bmatrix}$$
$$=\begin{bmatrix}8p_0-8q_0\\ -8p_0+8q_0\end{bmatrix}$$

Step-3

Thus, $x_k = \begin{bmatrix} (-1)^k \left(2^{k-1} p_0 - 2^{k-1} q_0\right) \\ (-1)^{k+1} \left(2^{k-1} p_0 - 2^{k-1} q_0\right) \end{bmatrix}$.

Except when $(p_0, q_0) = (\alpha, \alpha)$, the two sequences $(-1)^k \left(2^{k-1} p_0 - 2^{k-1} q_0\right)$ and $(-1)^{k+1} \left(2^{k-1} p_0 - 2^{k-1} q_0\right)$ are not converging. Thus, even when we had $b = (0,0)$, the sequences are not converging.

Therefore, when $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$, $x_{k+1} = (I - A) x_k + b$ does not converge.