Step-1

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Suppose B has the columns of A in reverse order.

We have to solve $(A-B)x=0$ to show that $A-B$ is not invertible.

Step-2

Let $A=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ be any matrix.

Then by definition of the matrix B, we get $B=\begin{bmatrix} c & d \\ a & b \end{bmatrix}$.

Now

$$\begin{aligned} A-B &= \begin{bmatrix} a & b \\ c & d \end{bmatrix} - \begin{bmatrix} c & d \\ a & b \end{bmatrix} \\ &= \begin{bmatrix} a-c & b-d \\ c-a & d-b \end{bmatrix} \end{aligned}$$

Step-3

Now the system $(A-B)x=0$ is $\begin{bmatrix} a-c & b-d \\ c-a & d-b \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 0 \\ 0 \end{bmatrix}$

Subtracting row 1 from row 2 gives $\begin{bmatrix} a-c & b-d \\ 0 & 0 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix}=\begin{bmatrix} 0 \\ 0 \end{bmatrix}$

In the above elimination, the last column becomes zero.

Therefore, the system has no solution.

Hence $A-B$ is not invertible.