Step-1

We have to find three values of *a* for which elimination breaks down, temporarily or permanently, in

$$\begin{aligned} au+v &= 1 \\ 4u+av &= 2 \end{aligned}$$

Breakdown at the first step and can be fixed by exchanging rows-but not breakdown at the last step.

Step-2

If $a=0$ then the equations are

$$\begin{aligned} v &= 1 \\ 4u &= 2 \end{aligned}$$

Now they require row exchange and the system is non singular.

Step-3

If $a=2$ then the equations are

$$\begin{aligned} 2u+v &= 1 \\ 4u+2v &= 2 \end{aligned}$$

It is singular system with 2 pivots by applying row 2 â€“ 2times of row1 becomes

$$2u+v=1$$

Now this has infinite solutions.

Step-4

If $a=-2$ then the equations are

$$\begin{aligned} -2u+v &= 1 \\ 4u-2v &= 2 \end{aligned}$$

It is singular system with no solution because after elimination of first step it becomes $0=1$ position.