**Algorithm:** $[A,B] := \textsc{GaussJordan\_MRHS\_Part1}(A,B)$

**Partition** $A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$

**where** $A_{TL}$ is $0 \times 0$, $B_T$ has $0$ rows

**while** $m(A_{TL}) < m(A)$ **do**

**Repartition**

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ \hline B_2 \end{array}\right)$$

$a_{01} := a_{01}/\alpha_{11}$ $\quad (= u_{01})$

$a_{21} := a_{21}/\alpha_{11}$ $\quad (= l_{21})$

$A_{02} := A_{02} - a_{01}a_{12}^T$ $\quad (= A_{02} - u_{01}a_{12}^T)$

$A_{22} := A_{22} - a_{21}a_{12}^T$ $\quad (= A_{22} - l_{21}a_{12}^T)$

$B_0 := B_0 - a_{01}b_1^T$ $\quad (= B_0 - u_{01}b_1^T)$

$B_2 := B_2 - a_{21}b_1^T$ $\quad (= B_2 - l_{21}b_1^T)$

$a_{01} := 0$ (zero vector)

$a_{21} := 0$ (zero vector)

**Continue with**

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ \hline B_2 \end{array}\right)$$

**endwhile**

**Algorithm:** $[A,B] := \textsc{GaussJordan\_MRHS\_Part2}(A,B)$

**Partition** $A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$

**where** $A_{TL}$ is $0 \times 0$, $B_T$ has $0$ rows

**while** $m(A_{TL}) < m(A)$ **do**

**Repartition**

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ \hline B_2 \end{array}\right)$$

$b_1^T := (1/\alpha_{11})b_1^T$

$\alpha_{11} := 1$

**Continue with**

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ \hline B_2 \end{array}\right)$$

**endwhile**