

**Algorithm:**  $B := \text{GUSSJORDAN\_MRHS\_ALT\_UNB}(A, B)$

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

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

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

**Repartition**

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

$$\begin{aligned} a_{01} &:= a_{01}/\alpha_{11}, & a_{21} &:= a_{21}/\alpha_{11} \\ A_{02} &:= A_{02} - a_{01}a_{12}^T, & A_{22} &:= A_{22} - a_{21}a_{12}^T \\ B_0 &:= B_0 - a_{01}b_1^T, & B_2 &:= B_2 - a_{21}b_1^T \\ a_{01} &:= 0, & a_{21} &:= 0 \end{aligned}$$

$$\begin{aligned} a_{12}^T &:= a_{12}^T/\alpha_{11} & (\text{extra vs Gaussjordan\_mrhs}) \\ b_1^T &:= b_1^T/\alpha_{11} \\ \alpha_{11} &:= 0 \end{aligned}$$

**Continue with**

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

**endwhile**