Step	Algorithm: $B = LB$
1a	$\{B = \widehat{B}\}$
4	$L \to \left(\begin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right), B \to \left(\begin{array}{c c} B_T \\ \hline B_B \end{array}\right)$ where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows
2	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\}$
3	while $m(L_{BR}) < m(L)$ do
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land m(L_{BR}) < m(L) \right\}$
5a	$ \left(\begin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c c} L_{00} & l_{01} & L_{02} \\ l_{10}^T & \lambda_{11} & l_{12}^T \\ \hline L_{20} & l_{21} & L_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right) $ where $\lambda_{11}$ is $1 \times 1$ , $b_1$ has 1 row
6	$\left\{ \begin{array}{c} \left( \frac{B_0}{b_1^T} \right) = \left( \frac{\widehat{B}_0}{\widehat{b}_1^T} \right) \\ L_{22}\widehat{B}_2 \end{array} \right\}$
8	$B_2 := l_{21}b_1^T + B_2$ $b_1^T := \lambda_{11}b_1^T$
7	$\left\{ \begin{array}{c} \left(\frac{B_0}{b_1^T}\right) = \left(\frac{\widehat{B}_0}{\lambda_{11}\widehat{b}_1^T}\right) \\ l_{21}b_1^T + L_{22}\widehat{B}_2 \end{array} \right\}$
5b	$ \left(\begin{array}{c c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c c c} L_{00} & l_{01} & L_{02} \\ \hline l_{10}^T & \lambda_{11} & l_{12}^T \\ L_{20} & l_{21} & L_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right) $
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$
1b	$\{B = L\widehat{B}\}$

Step	Algorithm: $B = LB$	
1a	{	
4		
	where	
		1
2		}
3	while do	1
<u> </u>		7
2,3	^	}
		J
5a		
	where	
6		
	· ·	J
8		
7	<b>{</b>	}
5b		
		7
2	₹	}
	endwhile	7
2,3		
-, -		
1b	{	

Step	Algorithm: $B = LB$
1a	$\{B = \widehat{B}\}$
4	where
2	$\bigg  \bigg\{$
3	while do
2,3	
5a	where
6	
8	
7	
5b	
2	
	endwhile
2,3	$\left  \left. \left\{ \right. \right. \right. \right. \wedge \neg ( \left. \right. \right. \right. \right. $
1b	$\{B = L\widehat{B}\}$

Step	Algorithm: $B = LB$
1a	$\{B = \widehat{B} $
4	where
2	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\}$
3	while do
2,3	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \qquad \right\}$
5a	where
6	
8	
7	
5b	
2	$\left\{ \begin{array}{c} \left(\frac{B_T}{B_B}\right) = \left(\frac{\widehat{B}_T}{L_{BR}\widehat{B}_B}\right) \end{array} \right\}$
	endwhile
2,3	$ \left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg ( ) \right\} $
1b	$\{B = L\widehat{B}\}$

Step	Algorithm: $B = LB$	
1a	$\{B = \widehat{B}\}$	}
4	where	
2	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right.$	
3	while $m(L_{BR}) < m(L)$ do	
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \wedge m(L_{BR}) < m(L) \right\}$	
5a	where	
6		
8		
7		
5b		
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right.$	
	endwhile	
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$	
1b	$\{B=L\widehat{B}$	}

Step	Algorithm: $B = LB$	
1a	$\{B=\widehat{B}$	}
4	$L  o \left( egin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \\ \hline \end{array}  ight), \ B  o \left( egin{array}{c c} B_T \\ \hline B_B \\ \hline \end{array}  ight)$ where $L_{BR}$ is $0  imes 0$ , $B_B$ has 0 rows	
2	where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows $ \left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right. $	
3	while $m(L_{BR}) < m(L)$ do	
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR}\widehat{B}_B} \right) \land m(L_{BR}) < m(L) \right\}$	
5a	where	
6		
8		
7		
5b		
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right.$	
	endwhile	
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$	
1b	$\{B = L\widehat{B}$	}

Step	Algorithm: $B = LB$
1a	$\{B = \widehat{B}\}$
4	$L \to \left(\begin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right), B \to \left(\begin{array}{c c} B_T \\ \hline B_B \end{array}\right)$ where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows
2	$ \left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\} $
3	while $m(L_{BR}) < m(L)$ do
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land m(L_{BR}) < m(L) \right\}$
5a	$ \begin{pmatrix} L_{TL} & L_{TR} \\ L_{BL} & L_{BR} \end{pmatrix} \rightarrow \begin{pmatrix} L_{00} & l_{01} & L_{02} \\ l_{10}^T & \lambda_{11} & l_{12}^T \\ L_{20} & l_{21} & L_{22} \end{pmatrix}, \begin{pmatrix} B_T \\ B_B \end{pmatrix} \rightarrow \begin{pmatrix} B_0 \\ b_1^T \\ B_2 \end{pmatrix} $ where $\lambda_{11}$ is $1 \times 1$ , $b_1$ has 1 row
6	
8	
7	
5b	$ \left(\begin{array}{c c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c c c} L_{00} & l_{01} & L_{02} \\ \hline l_{10}^T & \lambda_{11} & l_{12}^T \\ L_{20} & l_{21} & L_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right) $
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$
1b	$\{B = L\widehat{B}\}$

Step	Algorithm: $B = LB$
1a	$\{B=\widehat{B}$
4	$L \to \left(\begin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right), B \to \left(\begin{array}{c c} B_T \\ \hline B_B \end{array}\right)$ where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows
2	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\}$
3	while $m(L_{BR}) < m(L)$ do
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land m(L_{BR}) < m(L) \right\}$
5a	$ \left(\begin{array}{c c}L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR}\end{array}\right) \rightarrow \left(\begin{array}{c c}L_{00} & l_{01} & L_{02} \\ l_{10}^T & \lambda_{11} & l_{12}^T \\ \hline L_{20} & l_{21} & L_{22}\end{array}\right), \left(\begin{array}{c}B_T \\ \hline B_B\end{array}\right) \rightarrow \left(\begin{array}{c}B_0 \\ b_1^T \\ \hline B_2\end{array}\right) $ where $\lambda_{11}$ is $1 \times 1$ , $b_1$ has 1 row
6	$\left\{ \begin{array}{c} \left(\frac{B_0}{b_1^T}\right) = \left(\frac{\widehat{B}_0}{\widehat{b}_1^T}\right) \\ L_{22}\widehat{B}_2 \end{array} \right\}$
8	
7	
5b	$\left(\begin{array}{c c}L_{BL} & L_{BR}\end{array}\right) = \left(\begin{array}{c}l_{10} & l_{11} & l_{12} \\ L_{20} & l_{21} & L_{22}\end{array}\right)^{\frac{1}{2}} \left(\begin{array}{c}B_{B}\end{array}\right) = \left(\begin{array}{c}s_{1} \\ B_{2}\end{array}\right)$
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$
1b	$\{B = L\widehat{B}\}$

Step	Algorithm: $B = LB$
1a	$\{B=\widehat{B}$
4	$L  o \left( \frac{L_{TL}}{L_{BL}} \left  L_{BR} \right  \right), B  o \left( \frac{B_T}{B_B} \right)$ where $L_{DR}$ is $0  imes 0$ , $R_D$ has $0$ rows
2	where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows $ \left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\} $
3	while $m(L_{BR}) < m(L)$ do
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR}\widehat{B}_B} \right) \land m(L_{BR}) < m(L) \right\}$
5a	$ \left(\begin{array}{c c}L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR}\end{array}\right) \rightarrow \left(\begin{array}{c c}L_{00} & l_{01} & L_{02} \\ l_{10}^T & \lambda_{11} & l_{12}^T \\ \hline L_{20} & l_{21} & L_{22}\end{array}\right), \left(\begin{array}{c}B_T \\ \hline B_B\end{array}\right) \rightarrow \left(\begin{array}{c}B_0 \\ b_1^T \\ \hline B_2\end{array}\right) $ where $\lambda_{11}$ is $1 \times 1$ , $b_1$ has 1 row
6	$ \left\{ \begin{array}{c} \left(\frac{B_0}{b_1^T}\right) = \left(\frac{\widehat{B}_0}{\widehat{b}_1^T}\right) \\ L_{22}\widehat{B}_2 \end{array} \right\} $
8	
7	$ \left\{ \begin{array}{c} \left(\frac{B_0}{b_1^T}\right) = \left(\frac{\widehat{B}_0}{\lambda_{11}\widehat{b}_1^T}\right) \\ l_{21}b_1^T + L_{22}\widehat{B}_2 \end{array} \right\} $
5b	$ \left(\begin{array}{c c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c c c} L_{00} & l_{01} & L_{02} \\ \hline l_{10}^T & \lambda_{11} & l_{12}^T \\ L_{20} & l_{21} & L_{22} \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right) $
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right.$
	endwhile
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$
1b	$\{B = L\widehat{B}\}$

Step	Algorithm: $B = LB$
1a	$\{B = \widehat{B}\}$
4	$L \to \left(\frac{L_{TL}}{L_{BL}} \begin{vmatrix} L_{TR} \\ L_{BL} \end{vmatrix} \right), B \to \left(\frac{B_T}{B_B}\right)$ where $L_{DR}$ is $0 \times 0$ , $B_D$ has 0 rows
2	where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows $ \left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right\} $
3	while $m(L_{BR}) < m(L)$ do
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land m(L_{BR}) < m(L) \right\}$
5a	$ \left(\begin{array}{c c}L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR}\end{array}\right) \rightarrow \left(\begin{array}{c c}L_{00} & l_{01} & L_{02} \\ l_{10}^T & \lambda_{11} & l_{12}^T \\ \hline L_{20} & l_{21} & L_{22}\end{array}\right), \left(\begin{array}{c}B_T \\ \hline B_B\end{array}\right) \rightarrow \left(\begin{array}{c}B_0 \\ b_1^T \\ \hline B_2\end{array}\right) $ where $\lambda_{11}$ is $1 \times 1$ , $b_1$ has 1 row
6	$ \left\{ \begin{array}{c} \left(\frac{B_0}{b_1^T}\right) = \left(\frac{\widehat{B}_0}{\widehat{b}_1^T}\right) \\ B_2 \end{array} \right) = \left(\frac{\widehat{B}_0}{\widehat{b}_1^T}\right) \\ L_{22}\widehat{B}_2 \end{array} \right\} $
8	$B_2 := l_{21}b_1^T + B_2$ $b_1^T := \lambda_{11}b_1^T$
7	$ \left\{ \begin{array}{c} \left(\frac{B_0}{b_1^T}\right) = \left(\frac{\widehat{B}_0}{\lambda_{11}\widehat{b}_1^T}\right) \\ l_{21}b_1^T + L_{22}\widehat{B}_2 \end{array} \right\} $
5b	$ \left(\begin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c c} L_{00} & l_{01} & L_{02} \\ \hline l_{10}^T & \lambda_{11} & l_{12}^T \\ L_{20} & l_{21} & L_{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 \\ B_2 \end{array}\right) $
2	$\left\{ \qquad \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \right.$
	endwhile
2,3	$\left\{ \left( \frac{B_T}{B_B} \right) = \left( \frac{\widehat{B}_T}{L_{BR} \widehat{B}_B} \right) \land \neg (m(L_{BR}) < m(L)) \right\}$
1b	$\{B = L\widehat{B}\}$

Algorithm: $B = LB$
$L \to \left(\begin{array}{c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right), B \to \left(\begin{array}{c c} B_T \\ \hline B_B \end{array}\right)$ where $L_{BR}$ is $0 \times 0$ , $B_B$ has 0 rows
while $m(L_{BR}) < m(L)$ do
$ \left(\begin{array}{c c}L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR}\end{array}\right) \rightarrow \left(\begin{array}{c c}L_{00} & l_{01} & L_{02} \\ l_{10}^T & \lambda_{11} & l_{12}^T \\ \hline L_{20} & l_{21} & L_{22}\end{array}\right), \left(\begin{array}{c}B_T \\ \hline B_B\end{array}\right) \rightarrow \left(\begin{array}{c}B_0 \\ b_1^T \\ \hline B_2\end{array}\right) $ where $\lambda_{11}$ is $1 \times 1$ , $b_1$ has 1 row
$B_2 := l_{21}b_1^T + B_2$ $b_1^T := \lambda_{11}b_1^T$
$ \left(\begin{array}{c c c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c c c} L_{00} & l_{01} & L_{02} \\ \hline l_{10}^T & \lambda_{11} & l_{12}^T \\ L_{20} & l_{21} & L_{22} \end{array}\right), \left(\begin{array}{c c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right) $
endwhile

Algorithm: B = LB

$$L o \left( \begin{array}{c|c} L_{TL} & L_{TR} \\ \hline L_{BL} & L_{BR} \end{array} \right) \, , \, B o \left( \begin{array}{c|c} B_T \\ \hline B_B \end{array} \right)$$

where  $L_{BR}$  is  $0 \times 0$ ,  $B_B$  has 0 rows

while  $m(L_{BR}) < m(L)$  do

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

where  $\lambda_{11}$  is  $1 \times 1$ ,  $b_1$  has 1 row

$$B_2 := l_{21}b_1^T + B_2$$

$$b_1^T := \lambda_{11} b_1^T$$

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

endwhile