Step	Algorithm: $[C] := \text{SYR}2\text{K_LN_UNB_VAR}9(A, B, C)$
1a	$\left\{ C = \widehat{C} \right\}$
4	$A \to \begin{pmatrix} A_L A_R \end{pmatrix}$, $B \to \begin{pmatrix} B_L B_R \end{pmatrix}$ where A_L has 0 columns, B_L has 0 columns
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
3	while $n(A_L) < n(A)$ do
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A) \right\}$
5a	$\begin{pmatrix} A_L \mid A_R \end{pmatrix} \to \begin{pmatrix} A_0 \mid a_1 \mid A_2 \end{pmatrix}, \begin{pmatrix} B_L \mid B_R \end{pmatrix} \to \begin{pmatrix} B_0 \mid b_1 \mid B_2 \end{pmatrix}$ where a_1 has 1 column, b_1 has 1 column
6	$\left\{ C = A_0 B_0^T + B_0 A_0^T + \widehat{C} \right\}$
8	$C := a_1 b_1^T + b_1 a_1^T + C$
7	$\left\{ C = A_0 B_0^T + B_0 A_0^T + a_1 b_1^T + b_1 a_1^T + \widehat{C} \right\}$
5b	$\left(\begin{array}{c c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{c c} A_0 & a_1 & A_2 \end{array}\right), \left(\begin{array}{c c} B_L & B_R \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 & b_1 & B_2 \end{array}\right)$
2	$\left\{ \qquad C = A_L B_L^T + B_L A_L^T + \widehat{C} $ \right\right\right\right\right\rightarrow{}{}
	endwhile
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge \neg (n(A_L) < n(A)) \right\}$
1b	$\left\{ [C] = \operatorname{syr}2k \ln(A, B, \widehat{C}) \right\}$

Step	Algorithm: $[C] := \text{SYR}2\text{K_LN_UNB_VAR}9(A, B, C)$
1a	{
4	
	where
2	{
3	while do
2,3	$ \left\{ \right. $
5a	
	where
6	}
8	
7	{
5b	
2	{
	endwhile
2,3	{ ∧¬() }
1b	{
Step	Algorithm: $[C] := \text{SYR2K_LN_UNB_VAR9}(A, B, C)$
1a	$\{C = \widehat{C}$
4	
4	where
2	\
3	while do
2,3	\[\lambda \]
5a	
- Ja	where
6	{
8	
7	{

5b

2

2,3

1b

endwhile

 $\big\{[C] = \operatorname{syr}2\mathrm{k.ln}(A,B,\widehat{C})$

 $\wedge \, \neg ($

```
Algorithm: [C] := \text{SYR}2\text{K\_LN\_UNB\_VAR}9(A, B, C)
Step
          {C = \widehat{C}}
 1a
  4
             where
          \left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}
  2
  3
          C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge
 2,3
 5a
                  where
  6
  8
  7
 5b
                 C = A_L B_L^T + B_L A_L^T + \widehat{C}
  2
          endwhile
          \left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge \neg (
 2,3
          \{[C] = \operatorname{syr}2k \ln(A, B, \widehat{C})
 1b
```

Step	Algorithm: $[C] := \text{SYR}2\text{K_LN_UNB_VAR}9(A, B, C)$	
1a	$\{C = \widehat{C}$	}
4	where	
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$	}
3	while $n(A_L) < n(A)$ do	
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A) \right\}$	$\bigg\}$
5a	where	
6	{	}
8		
7	{	}
5b		
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$	}
	endwhile	
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge \neg (n(A_L) < n(A)) \right\}$	}
1b	$\{[C] = \operatorname{syr}2k \ln(A, B, \widehat{C})$	}

Step	Algorithm: $[C] := \text{SYR}2\text{K_LN_UNB_VAR}9(A, B, C)$
Buch	
1a	$\{C = \widehat{C}\}$
4	$A \rightarrow \begin{pmatrix} A_L & A_R \end{pmatrix}, B \rightarrow \begin{pmatrix} B_L & B_R \end{pmatrix}$ where A_L has 0 columns, B_L has 0 columns
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
3	while $n(A_L) < n(A)$ do
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A) \right\}$
5a	where
6	
8	
7	{
5b	
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
	endwhile
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge \neg (n(A_L) < n(A)) \right\}$
1b	$\{[C] = \operatorname{syr}2k \ln(A, B, \widehat{C})$

```
Algorithm: [C] := SYR2K_LN_UNB_VAR9(A, B, C)
Step
               \{C=\widehat{C}
  1a
               A \rightarrow \left( \begin{array}{c|c} A_L & A_R \end{array} \right), B \rightarrow \left( \begin{array}{c|c} B_L & B_R \end{array} \right) where A_L has 0 columns, B_L has 0 columns
   4
               \left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}
   2
               while n(A_L) < n(A) do
   3
                          C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A)
 2,3
                         \begin{pmatrix} A_L \mid A_R \end{pmatrix} \rightarrow \begin{pmatrix} A_0 \mid a_1 \mid A_2 \end{pmatrix}, \begin{pmatrix} B_L \mid B_R \end{pmatrix} \rightarrow \begin{pmatrix} B_0 \mid b_1 \mid B_2 \end{pmatrix}
where a_1 has 1 column, b_1 has 1 column
  5a
   6
   8
   7
                         \left( A_L \middle| A_R \right) \leftarrow \left( A_0 \middle| a_1 \middle| A_2 \right), \left( B_L \middle| B_R \right) \leftarrow \left( B_0 \middle| b_1 \middle| B_2 \right)
  5b
                           C = A_L B_L^T + B_L A_L^T + \widehat{C}
   2
                endwhile
                \left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \land \neg (n(A_L) < n(A)) \right\}
 2,3
                \left\{ [C] = \operatorname{syr}2\mathrm{k\_ln}(A, B, \widehat{C}) \right\}
  1b
```

Step	Algorithm: $[C] := \text{SYR}2\text{K_LN_UNB_VAR}9(A, B, C)$	
1a	${C = \widehat{C}}$	}
4	$A \to (A_L A_R)$, $B \to (B_L B_R)$ where A_L has 0 columns, B_L has 0 columns	
2	$\left\{C = A_L B_L^T + B_L A_L^T + \widehat{C}\right\}$	}
3	while $n(A_L) < n(A)$ do	
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A) \right\}$	brace
5a	$\begin{pmatrix} A_L \mid A_R \end{pmatrix} \to \begin{pmatrix} A_0 \mid a_1 \mid A_2 \end{pmatrix}, \begin{pmatrix} B_L \mid B_R \end{pmatrix} \to \begin{pmatrix} B_0 \mid b_1 \mid B_2 \end{pmatrix}$ where a_1 has 1 column, b_1 has 1 column	
6	$\left\{ C = A_0 B_0^T + B_0 A_0^T + \widehat{C} \right\}$	}
8		
7	{	}
5b	$\left(A_L \middle A_R \right) \leftarrow \left(A_0 \middle a_1 \middle A_2 \right), \left(B_L \middle B_R \right) \leftarrow \left(B_0 \middle b_1 \middle B_2 \right)$	
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right.$	}
	endwhile	
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \land \neg (n(A_L) < n(A)) \right\}$	}
1b	$\{[C] = \operatorname{syr}2k \ln(A, B, \widehat{C})$	}

Step	Algorithm: $[C] := \text{SYR}2\text{K_LN_UNB_VAR}9(A, B, C)$
1a	$\{C = \widehat{C}$
4	$A \to \begin{pmatrix} A_L A_R \end{pmatrix}$, $B \to \begin{pmatrix} B_L B_R \end{pmatrix}$ where A_L has 0 columns, B_L has 0 columns
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
3	while $n(A_L) < n(A)$ do
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A) \right\}$
5a	$\begin{pmatrix} A_L \mid A_R \end{pmatrix} \to \begin{pmatrix} A_0 \mid a_1 \mid A_2 \end{pmatrix}, \begin{pmatrix} B_L \mid B_R \end{pmatrix} \to \begin{pmatrix} B_0 \mid b_1 \mid B_2 \end{pmatrix}$ where a_1 has 1 column, b_1 has 1 column
6	$\left\{ C = A_0 B_0^T + B_0 A_0^T + \widehat{C} \right\}$
8	
7	$\left\{ C = A_0 B_0^T + B_0 A_0^T + a_1 b_1^T + b_1 a_1^T + \widehat{C} \right\}$
5b	$\left(\begin{array}{c c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{c c} A_0 & a_1 & A_2 \end{array}\right), \left(\begin{array}{c c} B_L & B_R \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 & b_1 & B_2 \end{array}\right)$
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
	endwhile
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge \neg (n(A_L) < n(A)) \right\}$
1b	$\left\{ [C] = \operatorname{syr}2k_{-}\ln(A, B, \widehat{C}) \right\}$

Step	Algorithm: $[C] := \text{SYR2K_LN_UNB_VAR9}(A, B, C)$
1a	$\{C = \widehat{C} \}$
4	$A \to \begin{pmatrix} A_L A_R \end{pmatrix}$, $B \to \begin{pmatrix} B_L B_R \end{pmatrix}$ where A_L has 0 columns, B_L has 0 columns
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
3	while $n(A_L) < n(A)$ do
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge n(A_L) < n(A) \right\}$
5a	$\begin{pmatrix} A_L \mid A_R \end{pmatrix} \to \begin{pmatrix} A_0 \mid a_1 \mid A_2 \end{pmatrix}, \begin{pmatrix} B_L \mid B_R \end{pmatrix} \to \begin{pmatrix} B_0 \mid b_1 \mid B_2 \end{pmatrix}$ where a_1 has 1 column, b_1 has 1 column
6	$\left\{ C = A_0 B_0^T + B_0 A_0^T + \widehat{C} \right\}$
8	$C := a_1 b_1^T + b_1 a_1^T + C$
7	$\left\{ C = A_0 B_0^T + B_0 A_0^T + a_1 b_1^T + b_1 a_1^T + \widehat{C} \right\}$
5b	$\left(\begin{array}{c c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{c c} A_0 & a_1 & A_2 \end{array}\right), \left(\begin{array}{c c} B_L & B_R \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 & b_1 & B_2 \end{array}\right)$
2	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \right\}$
	endwhile
2,3	$\left\{ C = A_L B_L^T + B_L A_L^T + \widehat{C} \wedge \neg (n(A_L) < n(A)) \right\}$
1b	$\left\{ [C] = \operatorname{syr}2k \ln(A, B, \widehat{C}) \right\}$

Algorithm: $[C] := \text{SYR2K_LN_UNB_VAR9}(A, B, C)$
$A ightharpoonup \left(\left. A_L \right A_R \right), B ightharpoonup \left(\left. B_L \right B_R \right)$
where \dot{A}_L has 0 columns, \dot{B}_L has 0 columns
while $n(A_L) < n(A)$ do
$\begin{pmatrix} A_L \mid A_R \end{pmatrix} \to \begin{pmatrix} A_0 \mid a_1 \mid A_2 \end{pmatrix}, \begin{pmatrix} B_L \mid B_R \end{pmatrix} \to \begin{pmatrix} B_0 \mid b_1 \mid B_2 \end{pmatrix}$ where a_1 has 1 column, b_1 has 1 column
whole we have a column, of how a column
$C := a_1 b_1^T + b_1 a_1^T + C$
$\left(\begin{array}{c c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{c c} A_0 & a_1 & A_2 \end{array}\right), \left(\begin{array}{c c} B_L & B_R \end{array}\right) \leftarrow \left(\begin{array}{c c} B_0 & b_1 & B_2 \end{array}\right)$
endwhile

Algorithm: $[C] := SYR2K_LN_UNB_VAR9(A, B, C)$

$$A \to (A_L \mid A_R)$$
, $B \to (B_L \mid B_R)$

where A_L has 0 columns, B_L has 0 columns

while $n(A_L) < n(A)$ do

$$\left(\begin{array}{c|c}A_L & A_R\end{array}\right) \to \left(\begin{array}{c|c}A_0 & a_1 & A_2\end{array}\right) , \left(\begin{array}{c|c}B_L & B_R\end{array}\right) \to \left(\begin{array}{c|c}B_0 & b_1 & B_2\end{array}\right)$$

where a_1 has 1 column, b_1 has 1 column

$$C := a_1 b_1^T + b_1 a_1^T + C$$

$$C := a_1 b_1^T + b_1 a_1^T + C$$

$$\left(A_L \middle| A_R \right) \leftarrow \left(A_0 \middle| a_1 \middle| A_2 \right), \left(B_L \middle| B_R \right) \leftarrow \left(B_0 \middle| b_1 \middle| B_2 \right)$$

endwhile