Step	Algorithm:		
1a			
4			
	where		
2			
3	while do		
2,3		٨	
5a			
	where		
6			
8			
5b			
7			
2			
	endwhile		
2,3		^ ¬(	)
1b			

Step	Algorithm: $[C] := Syr2k_Lt_Blk_var2(A, B, C)$
1a	$C = \hat{C}$
4	$A  o \left(A_L \middle  A_R\right) , B  o \left(B_L \middle  B_R\right) , C  o \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right)$
	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} C_{BR}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} C_{BR}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \wedge n(A_L) < n(A) $
5a	Determine block size $b$
	$\left(A_L \middle  A_R\right) \rightarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \rightarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right) \rightarrow$
	$\Big ( C_{00} \Big   C_{01} \Big   C_{02} \Big )$
	$\left( egin{array}{c c} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{00} & C_{01} & C_{02} \end{array}  ight)$
	$(C_{20} C_{21} C_{22})$
	where $A_1$ has $b$ columns, $B_1$ has $b$ columns, $C_{11}$ is $b \times b$
6	$\left( egin{array}{c c c} C_{00} & C_{01} & C_{02} \\ \hline C & C & C \\ \hline \end{array} \right) = \left( egin{array}{c c c} A_0^T & D_0^T & A_0 + C_{00} & 0 & 0 \\ \hline A^T & D_0 & C & C & C \\ \hline \end{array} \right)$
O	$\begin{pmatrix} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} A_0^T B_0 + B_0^T A_0 + \widehat{C}_{00} & 0 & 0 \\ \hline A_1^T B_0 + \widehat{C}_{10} & \widehat{C}_{11} & 0 \\ \hline A_2^T B_0 + \widehat{C}_{20} & \widehat{C}_{21} \widehat{C}_{22} \end{pmatrix}$
	$C_{10} := B_1^T A_0 + \widehat{C}_{10}$
8	$C_{11} := A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11}$
	$C_{21} := A_2^T B_1 + \widehat{C}_{21}$
5b	$\left(A_L \middle  A_R\right) \leftarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \leftarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL}}{C_{BL}} \middle  C_{BR}\right) \leftarrow$
	$\Big(C_{00}\Big C_{01}\Big C_{02}\Big)$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
	$oxed{C_{20}C_{21}C_{22}}$
	$ \begin{pmatrix} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} A_0^T B_0 + B_0^T A_0 + \widehat{C}_{00} & 0 & 0 \\ A_1^T B_0 + B_1^T A_0 + \widehat{C}_{10} & A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11} & 0 \\ A_2^T B_0 + \widehat{C}_{20} & A_2^T B_1 + \widehat{C}_{21} & \widehat{C}_{22} \end{pmatrix} $
7	$ C_{10} C_{11} C_{12} = A_1^T B_0 + B_1^T A_0 + \widehat{C}_{10} A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11} 0 $
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} C_{BR}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
	endwhile
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \frac{C_{TR}}{C_{BR}}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \frac{\widehat{C}_{TR}}{\widehat{C}_{BR}}\right) \wedge \neg (n(A_L) < n(A)) $
1b	$[C] = \operatorname{Syr2k} \operatorname{lt}(A, B, \widehat{C})$

Algorithm:  $[C] := \text{Syr2k\_LT\_BLK\_VAr2}(A, B, C)$ 

$$A \to \left(A_L \middle| A_R\right), B \to \left(B_L \middle| B_R\right), C \to \left(\frac{C_{TL}}{C_{BL}}\middle| C_{BR}\right)$$

where  $A_L$  has 0 columns,  $B_L$  has 0 columns,  $C_{TL}$  is  $0 \times 0$ 

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

Determine block size b

$$\left( A_{L} \middle| A_{R} \right) \to \left( A_{0} \middle| A_{1} \middle| A_{2} \right) , \left( B_{L} \middle| B_{R} \right) \to \left( B_{0} \middle| B_{1} \middle| B_{2} \right) , \left( \frac{C_{TL} \middle| C_{TR}}{C_{BL} \middle| C_{BR}} \right) \to \left( \frac{C_{00} \middle| C_{01} \middle| C_{02}}{C_{10} \middle| C_{11} \middle| C_{12}} \right)$$

where  $A_1$  has b columns,  $B_1$  has b columns,  $C_{11}$  is  $b \times b$ 

$$C_{10} := B_1^T A_0 + \widehat{C}_{10}$$

$$C_{11} := A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11}$$

$$C_{21} := A_2^T B_1 + \widehat{C}_{21}$$

$$\left( A_{L} \middle| A_{R} \right) \leftarrow \left( A_{0} \middle| A_{1} \middle| A_{2} \right), \left( B_{L} \middle| B_{R} \right) \leftarrow \left( B_{0} \middle| B_{1} \middle| B_{2} \right), \left( \frac{C_{TL} \middle| C_{TR}}{C_{BL} \middle| C_{BR}} \right) \leftarrow \left( \frac{C_{00} \middle| C_{01} \middle| C_{02}}{C_{10} \middle| C_{11} \middle| C_{12}} \right)$$

endwhile

Step	Algorithm: $[C] := \text{Syr2k\_LT\_BLK\_VAr2}(A, B, C)$
1a	$C = \hat{C}$
4	
2	where
3	while do
2,3	$\wedge$
5a	Determine block size
	where
6	
8	
5b	
7	
·	
2	
2	
	endwhile
2,3	$\wedge \neg ( \hspace{1cm} )$
1b	$[C] = \operatorname{Syr}2k \operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K_LT_BLK_VAr}2(A, B, C)$
1a	$C = \hat{C}$
4	
2	where $ \left(\frac{C_{TL} C_{TR}}{C_{BL} C_{BR}}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \hat{C}_{TL} \hat{C}_{TR}}{A_R^T B_L + \hat{C}_{BL} \hat{C}_{BR}}\right) $
3	while do
2,3	$egin{pmatrix} \left( rac{C_{TL}}{C_{BL}} \left  C_{TR}  ight) = \left( rac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \left  \widehat{C}_{BR}  ight) \wedge \end{pmatrix}$
5a	Determine block size
	where
6	
8	
5b	
7	
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
	endwhile
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \hat{C}_{TL}}{A_R^T B_L + \hat{C}_{BL}} \begin{vmatrix} \hat{C}_{TR} \\ \hat{C}_{BR} \end{vmatrix} \right) \land \neg ( )  $
1b	$[C] = \operatorname{Syr}2k \operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K\_LT\_BLK\_VAr}2(A, B, C)$
1a	$C = \hat{C}$
4	
	where
2	$ \left(\frac{C_{TL} \mid C_{TR}}{C_{BL} \mid C_{BR}}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL} \mid \widehat{C}_{TR}}{A_R^T B_L + \widehat{C}_{BL} \mid \widehat{C}_{BR}}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \wedge n(A_L) < n(A) $
5a	Determine block size
	where
6	
8	
0	
5b	
7	
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
	endwhile
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} \right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \land \neg (n(A_L) < n(A)) $
1b	$[C] = \operatorname{Syr}2k \operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K_LT_BLK_VAr}2(A, B, C)$
1a	$C = \widehat{C}$
4	$A  o \left(A_L \middle  A_R\right), B  o \left(B_L \middle  B_R\right), C  o \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right)$
2	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$ $ \left(\frac{C_{TL}}{C_{R}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} C_{BR}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \hat{C}_{TL}}{A_R^T B_L + \hat{C}_{BL}} \begin{vmatrix} \hat{C}_{TR} \\ \hat{C}_{BR} \end{vmatrix}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \wedge n(A_L) < n(A) $
5a	Determine block size
	where
	where
6	
8	
5b	
7	
	$\begin{pmatrix} C_{mn} & C_{mn} \end{pmatrix} \begin{pmatrix} A^T B_n + B^T A_{-} + \hat{C}_{-} & \hat{C}_{-} \end{pmatrix}$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
	endwhile
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} \right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \land \neg (n(A_L) < n(A)) $
1b	$[C] = \operatorname{Syr}2k_{-}\operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K_Ltt_BLK_VAr}2(A, B, C)$
1a	$C = \widehat{C}$
4	$A \to \left(A_L \middle  A_R\right), B \to \left(B_L \middle  B_R\right), C \to \left(\frac{C_{TL}}{C_{BL}}\middle  C_{BR}\right)$
	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \wedge n(A_L) < n(A) $
5a	Determine block size $b$
	$\left(A_L \middle  A_R\right) \rightarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \rightarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL}}{C_{BL}} \middle  C_{BR}\right) \rightarrow$
	$\begin{pmatrix} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$ where $A_1$ has $b$ columns, $B_1$ has $b$ columns, $C_{11}$ is $b \times b$
	Where III has a columns, DI has a columns, CII is a viv
6	
8	
5b	$\left(A_L \middle  A_R\right) \leftarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \leftarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL}}{C_{BL}} C_{TR}\right) \leftarrow$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
7	
2	$ \left(\frac{C_{TL} C_{TR}}{C_{BL} C_{BR}}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}  \widehat{C}_{TR}}{A_R^T B_L + \widehat{C}_{BL}  \widehat{C}_{BR}}\right) $
	endwhile
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \land \neg (n(A_L) < n(A)) $
1b	$[C] = \operatorname{Syr}2k \operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K_LT_BLK_VAr}2(A, B, C)$
1a	$C = \widehat{C}$
4	$A \to \left( A_L \middle  A_R \right) , B \to \left( B_L \middle  B_R \right) , C \to \left( \frac{C_{TL}}{C_{BL}} \middle  C_{BR} \right)$
	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} C_{BR}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \wedge n(A_L) < n(A) $
5a	Determine block size b
	$\left(A_L \middle  A_R\right) \rightarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \rightarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right) \rightarrow$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
	\ -
	where $A_1$ has $b$ columns, $B_1$ has $b$ columns, $C_{11}$ is $b \times b$ $\begin{pmatrix} C_{12} & C_{13} & C_{14} &$
6	$ \begin{vmatrix} C_{00}   C_{01}   C_{02} \\ C_{10}   C_{11}   C_{12} \end{vmatrix} = \begin{vmatrix} T_{0}   D_{0} + D_{0}   T_{0} + C_{00}   0 & 0 \\ A^{T}   B_{0} + \widehat{C}_{10} & \widehat{C}_{11}   0 \end{vmatrix} $
	$\begin{pmatrix} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} A_0^T B_0 + B_0^T A_0 + \widehat{C}_{00} & 0 & 0 \\ \hline A_1^T B_0 + \widehat{C}_{10} & \widehat{C}_{11} & 0 \\ \hline A_2^T B_0 + \widehat{C}_{20} & \widehat{C}_{21} \widehat{C}_{22} \end{pmatrix}$
8	
5b	$\left(A_L \middle  A_R\right) \leftarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \leftarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right) \leftarrow$
	$\int C_{00}  C_{01}  C_{02}$
	$oxed{C_{10}   C_{11}   C_{12}}$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
7	
2	$\left( \frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} \right) = \left( \frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right)$
	endwhile
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \land \neg (n(A_L) < n(A)) $
1b	$[C] = \operatorname{Syr}2k \operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K_LT_BLK_VAR}2(A, B, C)$
1a	$C = \widehat{C}$
4	$A \to \left(A_L \middle  A_R\right), B \to \left(B_L \middle  B_R\right), C \to \left(\frac{C_{TL}}{C_{BL}}\middle  C_{BR}\right)$
	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$
2	$ \left(\frac{C_{TL} C_{TR}}{C_{BL} C_{BR}}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}  \widehat{C}_{TR}}{A_R^T B_L + \widehat{C}_{BL}  \widehat{C}_{BR}}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \frac{C_{TR}}{C_{BR}}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \frac{\widehat{C}_{TR}}{\widehat{C}_{BR}}\right) \wedge n(A_L) < n(A) $
5a	Determine block size b
	$\left(A_L \middle  A_R\right) \rightarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \rightarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right) \rightarrow$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
	$\left[\begin{array}{c c} C_{10} & C_{11} & C_{12} \\ \hline \end{array}\right]$
	$C_{20}C_{21}C_{22}$ where $A_1$ has $b$ columns, $B_1$ has $b$ columns, $C_{11}$ is $b \times b$
6	$\begin{pmatrix} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} A_0^T B_0 + B_0^T A_0 + \widehat{C}_{00} & 0 & 0 \\ \hline A_1^T B_0 + \widehat{C}_{10} & \widehat{C}_{11} & 0 \\ \hline A_2^T B_0 + \widehat{C}_{20} & \widehat{C}_{21} \widehat{C}_{22} \end{pmatrix}$
	$\left( \overline{C_{20}}  C_{21}  C_{22} \right)  \left( \overline{A_2^T B_0 + \widehat{C}_{20}}  \widehat{C}_{21}  \widehat{C}_{22} \right)$
8	
	/   \
5b	$\left(A_L \middle  A_R\right) \leftarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \leftarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right) \leftarrow$
	$\int C_{00}  C_{01}  C_{02}$
	$\left[ \begin{array}{c c} c_{00} & c_{10} & c_{11} \\ \hline C_{10} & C_{11} & C_{12} \end{array} \right]$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
	$ \begin{pmatrix} \frac{C_{00} C_{01} C_{02}}{C_{10} C_{11} C_{12}} \\ \frac{C_{20} C_{21} C_{22}}{C_{20} C_{21} C_{22}} \end{pmatrix} = \begin{pmatrix} \frac{A_0^T B_0 + B_0^T A_0 + \hat{C}_{00}}{A_1^T B_0 + B_1^T A_0 + \hat{C}_{10} A_1^T B_1 + B_1^T A_1 + \hat{C}_{11} & 0} \\ \frac{A_1^T B_0 + B_1^T A_0 + \hat{C}_{10} A_1^T B_1 + B_1^T A_1 + \hat{C}_{11} & 0}{A_2^T B_1 + \hat{C}_{21}} & \hat{C}_{22} \end{pmatrix} $
7	$\boxed{C_{10} C_{11} C_{12}} = \boxed{A_1^T B_0 + B_1^T A_0 + \hat{C}_{10} A_1^T B_1 + B_1^T A_1 + \hat{C}_{11} 0}$
2	$\left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right)$
	endwhile $\begin{pmatrix} C & C & C & C & C & C & C & C & C & C $
2	$\left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \land \neg (n(A_L) < n(A))$
1b	$ \begin{array}{c c} C_{BL} C_{BR} & A_{R}B_{L} + C_{BL} & C_{BR} \\ \hline [C] = Syr2k_{\perp}t(A, B, \hat{C}) \end{array} $
10	$[C] = Sy12K_{-10}(A, D, C)$

Step	Algorithm: $[C] := \text{Syr}2\text{K_LT_BLK_VAR}2(A, B, C)$
1a	$C = \hat{C}$
4	$A  o \left(A_L \middle  A_R\right) , B  o \left(B_L \middle  B_R\right) , C  o \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right)$
	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} C_{BR}\right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
3	while $n(A_L) < n(A)$ do
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \wedge n(A_L) < n(A) $
5a	Determine block size $b$
	$\left(A_L \middle  A_R\right) \rightarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \rightarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL} \middle  C_{TR}}{C_{BL} \middle  C_{BR}}\right) \rightarrow$
	$\int C_{00} \left  C_{01} \right  C_{02}  ight angle$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{00} & C_{00} & C_{00} \end{pmatrix}$
	$(C_{20} C_{21} C_{22})$
	where $A_1$ has $b$ columns, $B_1$ has $b$ columns, $C_{11}$ is $b \times b$
6	$\left( \begin{array}{c c} C_{00} & C_{01} & C_{02} \\ \hline C_{C_0} & C_{C_1} & C_{C_2} \end{array} \right) = \left( \begin{array}{c c} A_0 & D_0 + D_0 & A_0 + C_{00} & 0 & 0 \\ \hline A^T R_0 + \widehat{C}_{C_0} & \widehat{C}_{C_1} & 0 \end{array} \right)$
	$\begin{pmatrix} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} A_0^T B_0 + B_0^T A_0 + \widehat{C}_{00} & 0 & 0 \\ \hline A_1^T B_0 + \widehat{C}_{10} & \widehat{C}_{11} & 0 \\ \hline A_2^T B_0 + \widehat{C}_{20} & \widehat{C}_{21} \widehat{C}_{22} \end{pmatrix}$
	$C_{10} := B_1^T A_0 + \widehat{C}_{10}$
8	$C_{11} := A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11}$
	$C_{21} := A_2^T B_1 + \widehat{C}_{21}$
5b	$\left(A_L \middle  A_R\right) \leftarrow \left(A_0 \middle  A_1 \middle  A_2\right) , \left(B_L \middle  B_R\right) \leftarrow \left(B_0 \middle  B_1 \middle  B_2\right) , \left(\frac{C_{TL}}{C_{BL}} \middle  C_{BR}\right) \leftarrow$
	$\int C_{00}  C_{01}  C_{02}$
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
	$igg C_{20} ig C_{21} ig C_{22} igg $
	$ \begin{pmatrix} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{pmatrix} = \begin{pmatrix} A_0^T B_0 + B_0^T A_0 + \hat{C}_{00} & 0 & 0 \\ A_1^T B_0 + B_1^T A_0 + \hat{C}_{10} & A_1^T B_1 + B_1^T A_1 + \hat{C}_{11} & 0 \\ A_2^T B_0 + \hat{C}_{20} & A_2^T B_1 + \hat{C}_{21} & \hat{C}_{22} \end{pmatrix} $
7	$ \left  \begin{array}{c c} C_{10}   C_{11}   C_{12} \\ \hline \end{array} \right  = \left  \begin{array}{c c} A_1^T B_0 + B_1^T A_0 + C_{10}   A_1^T B_1 + B_1^T A_1 + C_{11}   0 \\ \hline \end{array} \right  $
	$C_{20} C_{21} C_{22}$ $A_2^TB_0 + C_{20}$ $A_2^TB_1 + C_{21}$ $C_{22}$
2	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix}\right) $
	endwhile
2,3	$ \left(\frac{C_{TL}}{C_{BL}} \begin{vmatrix} C_{TR} \\ C_{BL} \end{vmatrix} \right) = \left(\frac{A_L^T B_L + B_L^T A_L + \widehat{C}_{TL}}{A_R^T B_L + \widehat{C}_{BL}} \begin{vmatrix} \widehat{C}_{TR} \\ \widehat{C}_{BR} \end{vmatrix} \right) \land \neg (n(A_L) < n(A)) $
1b	$[C] = \operatorname{Syr}2k \operatorname{lt}(A, B, \widehat{C})$

Step	Algorithm: $[C] := \text{Syr}2\text{K\_LT\_BLK\_VAr}2(A, B, C)$
	$A  o \left(A_L \middle  A_R\right), B  o \left(B_L \middle  B_R\right), C  o \left(\frac{C_{TL}}{C_{BL}}\middle  C_{BR}\right)$
	where $A_L$ has 0 columns, $B_L$ has 0 columns, $C_{TL}$ is $0 \times 0$
	while $n(A_L) < n(A)$ do
	Determine block size $b$ $\begin{pmatrix} A_L   A_R \end{pmatrix} \rightarrow \begin{pmatrix} A_0   A_1   A_2 \end{pmatrix} , \begin{pmatrix} B_L   B_R \end{pmatrix} \rightarrow \begin{pmatrix} B_0   B_1   B_2 \end{pmatrix} , \begin{pmatrix} C_{TL}   C_{TR} \\ C_{BL}   C_{BR} \end{pmatrix} \rightarrow$
	$ \begin{pmatrix} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{pmatrix} $ where $A_1$ has $b$ columns, $B_1$ has $b$ columns, $C_{11}$ is $b \times b$
	$C_{10} := B_1^T A_0 + \widehat{C}_{10}$ $C_{11} := A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11}$ $C_{21} := A_2^T B_1 + \widehat{C}_{21}$
	$ \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) , \left( \frac{C_{TL}}{C_{BL}} \frac{C_{TR}}{C_{BR}} \right) \leftarrow $
	$egin{pmatrix} C_{00} & C_{01} & C_{02} \ \hline C_{10} & C_{11} & C_{12} \ \hline C_{20} & C_{21} & C_{22} \end{pmatrix}$
	endwhile

Algorithm:  $[C] := \text{Syr2k\_LT\_BLK\_VAr2}(A, B, C)$ 

$$A \to \left(A_L \middle| A_R\right), B \to \left(B_L \middle| B_R\right), C \to \left(\frac{C_{TL}}{C_{BL}}\middle| C_{BR}\right)$$

where  $A_L$  has 0 columns,  $B_L$  has 0 columns,  $C_{TL}$  is  $0 \times 0$ 

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

Determine block size b

$$\left( A_{L} \middle| A_{R} \right) \to \left( A_{0} \middle| A_{1} \middle| A_{2} \right) , \left( B_{L} \middle| B_{R} \right) \to \left( B_{0} \middle| B_{1} \middle| B_{2} \right) , \left( \frac{C_{TL} \middle| C_{TR}}{C_{BL} \middle| C_{BR}} \right) \to \left( \frac{C_{00} \middle| C_{01} \middle| C_{02}}{C_{10} \middle| C_{11} \middle| C_{12}} \right)$$

where  $A_1$  has b columns,  $B_1$  has b columns,  $C_{11}$  is  $b \times b$ 

$$C_{10} := B_1^T A_0 + \widehat{C}_{10}$$

$$C_{11} := A_1^T B_1 + B_1^T A_1 + \widehat{C}_{11}$$

$$C_{21} := A_2^T B_1 + \widehat{C}_{21}$$

$$\left( A_{L} \middle| A_{R} \right) \leftarrow \left( A_{0} \middle| A_{1} \middle| A_{2} \right), \left( B_{L} \middle| B_{R} \right) \leftarrow \left( B_{0} \middle| B_{1} \middle| B_{2} \right), \left( \frac{C_{TL} \middle| C_{TR}}{C_{BL} \middle| C_{BR}} \right) \leftarrow \left( \frac{C_{00} \middle| C_{01} \middle| C_{02}}{C_{10} \middle| C_{11} \middle| C_{12}} \right)$$

endwhile