Step	Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$
1a	$\{ C = \widehat{C} \}$
4	$C \rightarrow \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right)$, $A \rightarrow \left(\begin{array}{c} A_T \\ \hline A_B \end{array} \right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right)$ where C_{TL} is 0×0, A_T has 0 rows, B_T has 0 rows
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
3	while $m(C_{TL}) < m(C)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge m(C_{TL}) < m(C) \right\}$
5a	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c\|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array} \right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array} \right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array} \right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array} \right)$ where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row
6	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array} \right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ b_1^T A_0^T + \widehat{c}_{10}^T & \gamma_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & c_{21} & C_{22} \end{array} \right) \right\}$
8	$\gamma_{11} := a_1^T b_1 + b_1^T a_1 + \gamma_{11}$ $c_{10}^T := a_1^T B_0^T + c_{10}^T$ $c_{21} := B_2 a_1 + c_{21}$
7	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array} \right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ a_1^T B_0^T + b_1^T A_0^T + \widehat{c}_{10}^T & a_1^T b_1 + b_1^T a_1 + \widehat{\gamma}_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & B_2 a_1 + \widehat{c}_{21} & C_{22} \end{array} \right) \right\}$
5b	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc\|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array} \right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array} \right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array} \right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array} \right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge \neg (m(C_{TL}) < m(C)) \right\}$
1b	$\{ [C] = \mathrm{syr2k\_ln}(A, B, \widehat{C}) \}$

Step	Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$
1a	$\{$ $\}$
4	where
2	$\left\{ \right\}$
3	while do
2,3	$\left\{ \wedge \right\}$
5a	where
6	$\left\{ \right\}$
8	
7	$\left\{ \right\}$
5b	
2	$\left\{ \right\}$
	endwhile
2,3	$\left\{ \wedge \neg(\quad) \right\}$
1b	$\{$ $\}$

Step	Algorithm: $[C] := \text{SYR2K\_LN\_UNB\_VAR4}(A, B, C)$
1a	$\{C = \widehat{C}$ $\}$
4	where
2	$\left\{ \right\}$
3	while do
2,3	$\left\{ \wedge \right\}$
5a	where
6	$\left\{ \right\}$
8	
7	$\left\{ \right\}$
5b	
2	$\left\{ \right\}$
	endwhile
2,3	$\left\{ \wedge \neg (\quad) \right\}$
1b	$\{[C] = \text{syr2k\_ln}(A, B, \widehat{C})$ $\}$

Step	Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$
1a	$\{ C = \widehat{C} \}$
4	where
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
3	while do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge \right\}$
5a	where
6	$\left\{ \right\}$
8	
7	$\left\{ \right\}$
5b	
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge \neg(\qquad) \right\}$
1b	$\{ [C] = \mathrm{syr2k\_ln}(A, B, \widehat{C}) \}$

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3	while $m(C_{TL}) < m(C)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge m(C_{TL}) < m(C) \right\}$
5a	where
6	$\left\{ \right\}$
8	
7	$\left\{ \right\}$
5b	
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge \neg (m(C_{TL}) < m(C)) \right\}$
1b	$\{ [C] = \mathrm{syr2k\_ln}(A, B, \widehat{C}) \}$

Step	Algorithm: $[C] := \text{SYR2K\_LN\_UNB\_VAR4}(A, B, C)$
1a	$\{C = \widehat{C}$ $\}$
4	$C \rightarrow \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right)$, $A \rightarrow \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$ where C_{TL} is 0×0, A_T has 0 rows, B_T has 0 rows
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \right\}$
3	while $m(C_{TL}) < m(C)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \wedge m(C_{TL}) < m(C) \right\}$
5a	where
6	$\left\{ \right\}$
8	
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5b	
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \wedge \neg(m(C_{TL}) < m(C)) \right\}$
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3	while $m(C_{TL}) < m(C)$ do
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5a	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$ where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row
6	$\{ \}$
8	
7	$\{ \}$
5b	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array}\right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \wedge \neg(m(C_{TL}) < m(C)) \right\}$
1b	$\{ [C] = \text{syr2k\_ln}(A, B, \widehat{C}) \}$

Step	Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$
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5a	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$ where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row
6	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ b_1^T A_0^T + \widehat{c}_{10}^T & \gamma_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & c_{21} & C_{22} \end{array}\right) \right\}$
8	
7	$\{ \}$
5b	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array}\right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \wedge \neg (m(C_{TL}) < m(C)) \right\}$
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Step	Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$
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3	while $m(C_{TL}) < m(C)$ do
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5a	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$ where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row
6	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ b_1^T A_0^T + \widehat{c}_{10}^T & \gamma_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & c_{21} & C_{22} \end{array}\right) \right\}$
8	
7	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ a_1^T B_0^T + b_1^T A_0^T + \widehat{c}_{10}^T & a_1^T b_1 + b_1^T a_1 + \widehat{\gamma}_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & B_2 a_1 + \widehat{c}_{21} & C_{22} \end{array}\right) \right\}$
5b	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array}\right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array}\right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array}\right) \wedge \neg(m(C_{TL}) < m(C)) \right\}$
1b	$\{[C] = \text{syr2k\_ln}(A, B, \widehat{C})$ $\}$

Step	Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$
1a	$\{ C = \widehat{C} \}$
4	$C \rightarrow \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right)$, $A \rightarrow \left(\begin{array}{c} A_T \\ \hline A_B \end{array} \right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right)$ where C_{TL} is 0×0, A_T has 0 rows, B_T has 0 rows
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
3	while $m(C_{TL}) < m(C)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge m(C_{TL}) < m(C) \right\}$
5a	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c\|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array} \right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array} \right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array} \right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array} \right)$ where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row
6	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array} \right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ b_1^T A_0^T + \widehat{c}_{10}^T & \gamma_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & c_{21} & C_{22} \end{array} \right) \right\}$
8	$\gamma_{11} := a_1^T b_1 + b_1^T a_1 + \gamma_{11}$ $c_{10}^T := a_1^T B_0^T + c_{10}^T$ $c_{21} := B_2 a_1 + c_{21}$
7	$\left\{ \left(\begin{array}{ccc} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array} \right) = \left(\begin{array}{ccc} A_0 B_0^T + B_0 A_0^T + \widehat{C}_{00} & * & * \\ a_1^T B_0^T + b_1^T A_0^T + \widehat{c}_{10}^T & a_1^T b_1 + b_1^T a_1 + \widehat{\gamma}_{11} & * \\ B_2 A_0^T + \widehat{C}_{20} & B_2 a_1 + \widehat{c}_{21} & C_{22} \end{array} \right) \right\}$
5b	$\left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc\|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array} \right)$, $\left(\begin{array}{c} A_T \\ \hline A_B \end{array} \right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array} \right)$, $\left(\begin{array}{c} B_T \\ \hline B_B \end{array} \right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array} \right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} A_T B_T^T + B_T A_T^T + \widehat{C}_{TL} & * \\ \hline B_B A_T^T + \widehat{C}_{BL} & \widehat{C}_{BR} \end{array} \right) \wedge \neg (m(C_{TL}) < m(C)) \right\}$
1b	$\{ [C] = \mathrm{syr2k\_ln}(A, B, \widehat{C}) \}$

Algorithm: $[C] := \text{SYR2K\_LN\_UNB\_VAR4}(A, B, C)$

$$C \rightarrow \left(\begin{array}{c|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right), A \rightarrow \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right), B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$$

where C_{TL} is 0×0, A_T has 0 rows, B_T has 0 rows

while $m(C_{TL}) < m(C)$ **do**

$$\left(\begin{array}{c|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right), \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$$

where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row

$\gamma_{11} := a_1^T b_1 + b_1^T a_1 + \gamma_{11}$

$c_{10}^T := a_1^T B_0^T + c_{10}^T$

$c_{21} := B_2 a_1 + c_{21}$

$$\left(\begin{array}{c|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array}\right), \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$$

endwhile

Algorithm: $[C] := \textsc{syr2k\_ln\_unb\_var4}(A, B, C)$

$C \rightarrow \left(\begin{array}{c|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right)$, $A \rightarrow \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right)$, $B \rightarrow \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right)$

where C_{TL} is 0×0, A_T has 0 rows, B_T has 0 rows

while $m(C_{TL}) < m(C)$ **do**

$$\left(\begin{array}{c|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|cc} C_{00} & * & * \\ \hline c_{10}^T & \gamma_{11} & * \\ C_{20} & c_{21} & C_{22} \end{array}\right), \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \rightarrow \left(\begin{array}{c} A_0 \\ \hline a_1^T \\ A_2 \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \rightarrow \left(\begin{array}{c} B_0 \\ \hline b_1^T \\ B_2 \end{array}\right)$$

where γ_{11} is 1×1, a_1 has 1 row, b_1 has 1 row

$\gamma_{11} := a_1^T b_1 + b_1^T a_1 + \gamma_{11}$

$c_{10}^T := a_1^T B_0^T + c_{10}^T$

$c_{21} := B_2 a_1 + c_{21}$

$$\left(\begin{array}{c|c} C_{TL} & * \\ \hline C_{BL} & C_{BR} \end{array}\right) \leftarrow \left(\begin{array}{cc|c} C_{00} & * & * \\ c_{10}^T & \gamma_{11} & * \\ \hline C_{20} & c_{21} & C_{22} \end{array}\right), \left(\begin{array}{c} A_T \\ \hline A_B \end{array}\right) \leftarrow \left(\begin{array}{c} A_0 \\ a_1^T \\ \hline A_2 \end{array}\right), \left(\begin{array}{c} B_T \\ \hline B_B \end{array}\right) \leftarrow \left(\begin{array}{c} B_0 \\ b_1^T \\ \hline B_2 \end{array}\right)$$

endwhile