Step	Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$
1a	$\{C = \widehat{C}$ $\}$
4	$A \rightarrow \left(A_L \,\|\, A_R \right)$, $C \rightarrow \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right)$ where A_R has 0 columns, C_{BR} is 0×0
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
3	while $n(A_R) < n(A)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge n(A_R) < n(A) \right\}$
5a	**Determine block size b** $\left(A_L \,\|\, A_R \right) \rightarrow \left(A_0 \,\|\, A_1 \,\|\, A_2 \right)$, $\left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right)$ where A_1 has b columns, C_{11} is $b \times b$
6	$\left\{ \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right) = \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & A_2^T A_2 + \widehat{C}_{22} \end{array} \right) \right\}$
8	$C_{12} = A_1^T A2 + C_{12}$ $C_{11} = A_1^T A_1 + C_{11}$
7	$\left\{ \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right) = \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & A_1^T A_1 + \widehat{C}_{11} & A_1^T A2 + \widehat{C}_{12} \\ C_{20} & C_{21} & A_2^T A_2 + \widehat{C}_{22} \end{array} \right) \right\}$
5b	$\left(A_L \,\|\, A_R \right) \leftarrow \left(A_0 \,\|\, A_1 \,\|\, A_2 \right)$, $\left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge \neg(n(A_R) < n(A)) \right\}$
1b	$\{[C] = \text{syrk\_ac}(A, \widehat{C})$ $\}$

Step	Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$
1a	$\{ \quad \}$
4	where
2	$\left\{ \quad \right\}$
3	while do
2,3	$\left\{ \quad \wedge \quad \right\}$
5a	**Determine block size** b where
6	$\left\{ \quad \right\}$
8	
7	$\left\{ \quad \right\}$
5b	
2	$\left\{ \quad \right\}$
	endwhile
2,3	$\left\{ \quad \wedge \neg(\quad) \quad \right\}$
1b	$\{ \quad \}$

Step	Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$
1a	$\{C = \widehat{C}$ $\}$
4	where
2	$\left\{ \right\}$
3	while do
2,3	$\left\{ \wedge \right\}$
5a	**Determine block size** b where
6	$\left\{ \right\}$
8	
7	$\left\{ \right\}$
5b	
2	$\left\{ \right\}$
	endwhile
2,3	$\left\{ \wedge \neg(\quad) \right\}$
1b	$\{[C] = \mathrm{syrk\_ac}(A, \widehat{C})$ $\}$

Step	Algorithm: $[C] := \textsc{syrk\_ac\_blk\_var3}(A, C)$
1a	$\{C = \widehat{C}\}$
4	where
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \right\}$
3	**while** do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \wedge \right\}$
5a	**Determine block size** b where
6	$\left\{ \right\}$
8	
7	$\left\{ \right\}$
5b	
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \wedge \neg(\quad) \right\}$
1b	$\{[C] = \text{syrk\_ac}(A, \widehat{C})\}$

Step	Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$
1a	$\{C = \widehat{C} \qquad \}$
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3	while $n(A_R) < n(A)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \wedge n(A_R) < n(A) \right\}$
5a	**Determine block size** b where
6	$\{ \qquad \}$
8	
7	$\{ \qquad \}$
5b	
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array}\right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array}\right) \wedge \neg(n(A_R) < n(A)) \right\}$
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Step	Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$
1a	$\{ C = \widehat{C} \}$
4	$A \rightarrow \left(A_L \,\middle\|\, A_R \right)$, $C \rightarrow \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right)$ where A_R has 0 columns, C_{BR} is 0×0
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
3	while $n(A_R) < n(A)$ do
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5a	**Determine block size b** where
6	$\{ \}$
8	
7	$\{ \}$
5b	
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge \neg(n(A_R) < n(A)) \right\}$
1b	$\{ [C] = \text{syrk\_ac}(A, \widehat{C}) \}$

Step	Algorithm: $[C] := \textsc{syrk\_ac\_blk\_var3}(A, C)$
1a	$\{ C = \widehat{C} \}$
4	$A \rightarrow \left(A_L \,\middle\|\, A_R \right)$, $C \rightarrow \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right)$ where A_R has 0 columns, C_{BR} is 0×0
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
3	while $n(A_R) < n(A)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge n(A_R) < n(A) \right\}$
5a	**Determine block size b** $\left(A_L \,\middle\|\, A_R \right) \rightarrow \left(A_0 \,\middle\vert\, A_1 \,\middle\|\, A_2 \right)$, $\left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right)$ where A_1 has b columns, C_{11} is $b \times b$
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7	$\{ \}$
5b	$\left(A_L \,\middle\|\, A_R \right) \leftarrow \left(A_0 \,\middle\|\, A_1 \,\middle\vert\, A_2 \right)$, $\left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge \neg(n(A_R) < n(A)) \right\}$
1b	$\{ [C] = \text{syrk\_ac}(A, \widehat{C}) \}$

Step	Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$
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4	$A \rightarrow \left(A_L \,\middle\|\, A_R \right), \; C \rightarrow \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right)$ where A_R has 0 columns, C_{BR} is 0×0
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3	**while** $n(A_R) < n(A)$ **do**
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge n(A_R) < n(A) \right\}$
5a	**Determine block size b** $\left(A_L \,\middle\|\, A_R \right) \rightarrow \left(A_0 \,\middle\|\, A_1 \,\middle\|\, A_2 \right), \; \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right)$ where A_1 has b columns, C_{11} is $b \times b$
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8	
7	$\left\{ \quad \right\}$
5b	$\left(A_L \,\middle\|\, A_R \right) \leftarrow \left(A_0 \,\middle\|\, A_1 \,\middle\|\, A_2 \right), \; \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$
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	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge \neg (n(A_R) < n(A)) \right\}$
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8	
7	$\left\{ \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right) = \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & A_1^T A_1 + \widehat{C}_{11} & A_1^T A2 + \widehat{C}_{12} \\ C_{20} & C_{21} & A_2^T A_2 + \widehat{C}_{22} \end{array} \right) \right\}$
5b	$\left(A_L \,\Big\|\, A_R \right) \leftarrow \left(A_0 \,\Big\|\, A_1 \,\big\|\, A_2 \right), \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$
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	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge \neg(n(A_R) < n(A)) \right\}$
1b	$\{[C] = \text{syrk\_ac}(A, \widehat{C})$ $\}$

Step	Algorithm: $[C] := \textsc{syrk\_ac\_blk\_var3}(A, C)$
1a	$\{C = \widehat{C}\}$
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5a	**Determine block size** b $\left(A_L \| A_R \right) \rightarrow \left(A_0 \| A_1 \| A_2 \right)$, $\left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right)$ where A_1 has b columns, C_{11} is $b \times b$
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8	$C_{12} = A_1^T A2 + C_{12}$ $C_{11} = A_1^T A_1 + C_{11}$
7	$\left\{ \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right) = \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & A_1^T A_1 + \widehat{C}_{11} & A_1^T A2 + \widehat{C}_{12} \\ C_{20} & C_{21} & A_2^T A_2 + \widehat{C}_{22} \end{array} \right) \right\}$
5b	$\left(A_L \| A_R \right) \leftarrow \left(A_0 \| A_1 \| A_2 \right)$, $\left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c\|c\|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$
2	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) = \left(\begin{array}{c\|c} \widehat{C}_{TL} & \widehat{C}_{TR} \\ \hline \widehat{C}_{BL} & A_R^T A_R + \widehat{C}_{BR} \end{array} \right) \wedge \neg(n(A_R) < n(A)) \right\}$
1b	$\{[C] = \mathrm{syrk\_ac}(A, \widehat{C})\}$

Algorithm: $[C] := \textsc{syrk\_ac\_blk\_var3}(A, C)$

$A \rightarrow \left(A_L \,\middle|\, A_R \right)$, $C \rightarrow \left(\begin{array}{c|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right)$

where A_R has 0 columns, C_{BR} is 0×0

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

Determine block size b

$\left(A_L \,\middle|\, A_R \right) \rightarrow \left(A_0 \,\middle|\, A_1 \,\middle|\, A_2 \right)$, $\left(\begin{array}{c|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{cc|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right)$

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

$C_{12} = A_1^T A2 + C_{12}$

$C_{11} = A_1^T A_1 + C_{11}$

$\left(A_L \,\middle|\, A_R \right) \leftarrow \left(A_0 \,\middle|\, A_1 \,\middle|\, A_2 \right)$, $\left(\begin{array}{c|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c|cc} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$

endwhile

Algorithm: $[C] := \text{SYRK\_AC\_BLK\_VAR3}(A, C)$

$A \rightarrow \left(A_L \,\middle|\, A_R \right)$, $C \rightarrow \left(\begin{array}{c|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right)$

where A_R has 0 columns, C_{BR} is 0×0

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

Determine block size b

$$\left(A_L \,\middle|\, A_R \right) \rightarrow \left(A_0 \,\middle|\, A_1 \,\middle|\, A_2 \right) , \left(\begin{array}{c|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c|c|c} C_{00} & C_{01} & C_{02} \\ C_{10} & C_{11} & C_{12} \\ \hline C_{20} & C_{21} & C_{22} \end{array} \right)$$

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

$C_{12} = A_1^T A2 + C_{12}$

$C_{11} = A_1^T A_1 + C_{11}$

$$\left(A_L \,\middle|\, A_R \right) \leftarrow \left(A_0 \,\middle|\, A_1 \,\middle|\, A_2 \right) , \left(\begin{array}{c|c} C_{TL} & C_{TR} \\ \hline C_{BL} & C_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c|c|c} C_{00} & C_{01} & C_{02} \\ \hline C_{10} & C_{11} & C_{12} \\ C_{20} & C_{21} & C_{22} \end{array} \right)$$

endwhile