Step	Algorithm:
1a	
4	where
2	
3	while do
2,3	$\wedge$
5a	where
6	
8	
5b	
7	
2	
	endwhile
2,3	$\wedge \neg($ $)$
1b	

Step	Algorithm: $[y] := \text{SYM\_AXPY\_UNB\_VAR1}(A, x, y)$
1a	$y = \widehat{y}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$ where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row
6	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00} x_0 + \widehat{y}_0 \\ \hline \widehat{\psi}_1 \\ \hline \widehat{y}_2 \end{array}\right)$
8	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) := \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) + \left(\begin{array}{c} (a_{10}^T)^T \chi_1 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 \\ \hline 0 \end{array}\right)$
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$
7	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00} x_0 + (a_{10}^T)^T \chi_1 + \widehat{y}_0 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 + \widehat{\psi}_1 \\ \hline \widehat{y}_2 \end{array}\right)$
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$

$$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), \ x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right), \ y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$$

where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows

while $m(A_{TL}) < m(A)$ do

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$$

where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row

$$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) := \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) + \left(\begin{array}{c} (a_{10}^T)^T \chi_1 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 \\ \hline 0 \end{array}\right)$$

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$$

endwhile

Step	Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$
1a	$y = \widehat{y}$
4	where
2	
3	while do
2,3	$\wedge$
5a	where
6	
8	
5b	
7	
2	
	endwhile
2,3	$\wedge \neg($ $)$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \text{SYM\_AXPY\_UNB\_VAR1}(A, x, y)$
1a	$y = \widehat{y}$
4	where
2	$\left(\frac{y_T}{y_B}\right) = \left(\frac{A_{TL}X_T + \widehat{y}_T}{\widehat{y}_B}\right)$
3	**while** **do**
2,3	$\left(\frac{y_T}{y_B}\right) = \left(\frac{A_{TL}X_T + \widehat{y}_T}{\widehat{y}_B}\right) \wedge$
5a	where
6	
8	
5b	
7	
2	$\left(\frac{y_T}{y_B}\right) = \left(\frac{A_{TL}X_T + \widehat{y}_T}{\widehat{y}_B}\right)$
	endwhile
2	$\left(\frac{y_T}{y_B}\right) = \left(\frac{A_{TL}X_T + \widehat{y}_T}{\widehat{y}_B}\right) \wedge \neg(\qquad)$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$
1a	$y = \widehat{y}$
4	where
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	**while** $m(A_{TL}) < m(A)$ **do**
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	where
6	
8	
5b	
7	
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \text{SYM\_AXPY\_UNB\_VAR1}(A, x, y)$
1a	$y = \widehat{y}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	where
6	
8	
5b	
7	
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$
1a	$y = \widehat{y}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$ where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row
6	
8	
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$
7	
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \text{SYM\_AXPY\_UNB\_VAR1}(A, x, y)$
1a	$y = \widehat{y}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right), y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$ where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row
6	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00}x_0 + \widehat{y}_0 \\ \hline \widehat{\psi_1} \\ \hline \widehat{y}_2 \end{array}\right)$
8	
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$
7	
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$
1a	$y = \widehat{y}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$ where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row
6	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00}x_0 + \widehat{y}_0 \\ \hline \widehat{\psi}_1 \\ \hline \widehat{y}_2 \end{array}\right)$
8	
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$
7	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00}x_0 + (a_{10}^T)^T\chi_1 + \widehat{y}_0 \\ \hline a_{10}^T x_0 + a_{11}\chi_1 + \widehat{\psi}_1 \\ \hline \widehat{y}_2 \end{array}\right)$
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL}X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

Step	Algorithm: $[y] := \text{SYM\_AXPY\_UNB\_VAR1}(A, x, y)$
1a	$y = \widehat{y}$
4	$A \rightarrow \left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right)$, $x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
3	while $m(A_{TL}) < m(A)$ do
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge m(A_{TL}) < m(A)$
5a	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$ where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row
6	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00} x_0 + \widehat{y}_0 \\ \hline \widehat{\psi}_1 \\ \hline \widehat{y}_2 \end{array}\right)$
8	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) := \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) + \left(\begin{array}{c} (a_{10}^T)^T \chi_1 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 \\ \hline 0 \end{array}\right)$
5b	$\left(\begin{array}{c\|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c\|c\|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$
7	$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) = \left(\begin{array}{c} A_{00} x_0 + (a_{10}^T)^T \chi_1 + \widehat{y}_0 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 + \widehat{\psi}_1 \\ \hline \widehat{y}_2 \end{array}\right)$
2	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right)$
	endwhile
2,3	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) = \left(\begin{array}{c} A_{TL} X_T + \widehat{y}_T \\ \hline \widehat{y}_B \end{array}\right) \wedge \neg(m(A_{TL}) < m(A))$
1b	$[y] = Ax + y$

<table>
<tr><td>Step</td><td>Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td>$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right)$, $x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array} \right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right)$
where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td>while $m(A_{TL}) < m(A)$ do</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array} \right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array} \right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array} \right)$
where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td>$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array} \right) := \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array} \right) + \left(\begin{array}{c} (a_{10}^T)^T \chi_1 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 \\ \hline 0 \end{array} \right)$</td></tr>
<tr><td></td><td>$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right)$, $\left(\begin{array}{c} x_T \\ \hline x_B \end{array} \right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array} \right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array} \right)$</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td>endwhile</td></tr>
<tr><td></td><td></td></tr>
<tr><td></td><td></td></tr>
</table>

Algorithm: $[y] := \textsc{sym\_axpy\_unb\_var1}(A, x, y)$

$$A \rightarrow \left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right), x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right), y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$$

where A_{TL} is 0×0, x_T has 0 rows, y_T has 0 rows

while $m(A_{TL}) < m(A)$ **do**

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \rightarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$$

where α_{11} is 1×1, χ_1 has 1 row, ψ_1 has 1 row

$$\left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) := \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right) + \left(\begin{array}{c} (a_{10}^T)^T \chi_1 \\ \hline a_{10}^T x_0 + a_{11} \chi_1 \\ \hline 0 \end{array}\right)$$

$$\left(\begin{array}{c|c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array}\right) \leftarrow \left(\begin{array}{c|c|c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array}\right), \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ \hline y_2 \end{array}\right)$$

endwhile