

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

Step	Algorithm: $y := Ax + y$ (A symmetric stored in lower triangular part)
1a	{
4	where
2	{
3	while do
2,3	{ \wedge }
5a	where
6	{
8	$A_{22}x_2 +$
7	{
5b	
2	{
	endwhile
2,3	{ $\wedge \neg($) }
1b	}

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2	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{\hat{y}_T}{A_{BR}x_B + \hat{y}_B} \right) \right\}$
3	while do
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{\hat{y}_T}{A_{BR}x_B + \hat{y}_B} \right) \wedge \right\}$
5a	where
6	$\left\{ \right\}$
8	$A_{22}x_2 +$
7	$\left\{ \right\}$
5b	
2	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{\hat{y}_T}{A_{BR}x_B + \hat{y}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{\hat{y}_T}{A_{BR}x_B + \hat{y}_B} \right) \wedge \neg(\quad) \right\}$
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2	$\left\{ \left(\begin{array}{c} y_T \\ y_B \end{array} \right) = \left(\begin{array}{c} \hat{y}_T \\ \hline A_{BR}x_B + \hat{y}_B \end{array} \right) \right\}$
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	endwhile
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6	$\left\{ \right\}$
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5b	$\left(\begin{array}{c c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right), \left(\begin{array}{c} x_T \\ x_B \end{array} \right) \leftarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array} \right), \left(\begin{array}{c} y_T \\ y_B \end{array} \right) \leftarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array} \right)$
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	endwhile
2,3	$\left\{ \left(\begin{array}{c} y_T \\ y_B \end{array} \right) = \left(\begin{array}{c} \hat{y}_T \\ \hline A_{BR}x_B + \hat{y}_B \end{array} \right) \wedge \neg(m(A_{BR}) < m(A)) \right\}$
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2	$\left\{ \begin{pmatrix} y_T \\ y_B \end{pmatrix} = \begin{pmatrix} \hat{y}_T \\ A_{BR}x_B + \hat{y}_B \end{pmatrix} \right\}$
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2,3	$\left\{ \begin{pmatrix} y_T \\ y_B \end{pmatrix} = \begin{pmatrix} \hat{y}_T \\ A_{BR}x_B + \hat{y}_B \end{pmatrix} \wedge \neg(m(A_{BR}) < m(A)) \right\}$
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5b	$\left(\begin{array}{c c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right), \begin{pmatrix} x_T \\ x_B \end{pmatrix} \leftarrow \begin{pmatrix} x_0 \\ \chi_1 \\ x_2 \end{pmatrix}, \begin{pmatrix} y_T \\ y_B \end{pmatrix} \leftarrow \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix}$
2	$\left\{ \begin{pmatrix} y_T \\ y_B \end{pmatrix} = \begin{pmatrix} \hat{y}_T \\ A_{BR}x_B + \hat{y}_B \end{pmatrix} \right\}$
	endwhile
2,3	$\left\{ \begin{pmatrix} y_T \\ y_B \end{pmatrix} = \begin{pmatrix} \hat{y}_T \\ A_{BR}x_B + \hat{y}_B \end{pmatrix} \wedge \neg(m(A_{BR}) < m(A)) \right\}$
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5b	$\left(\begin{array}{c c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc c} A_{00} & a_{01} & A_{02} \\ \hline a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right), \begin{pmatrix} x_T \\ x_B \end{pmatrix} \leftarrow \begin{pmatrix} x_0 \\ \chi_1 \\ x_2 \end{pmatrix}, \begin{pmatrix} y_T \\ y_B \end{pmatrix} \leftarrow \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix}$
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	while $m(A_{BR}) < m(A)$ do
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	$\psi_1 := \alpha_{11}\chi_1 + a_{21}^T x_2 + \psi_1$ $y_2 := a_{21}\chi_1 + A_{22}x_2 + y_2$
	$\left(\begin{array}{c c} A_{TL} & A_{TR} \\ \hline A_{BL} & A_{BR} \end{array} \right) \leftarrow \left(\begin{array}{cc c} A_{00} & a_{01} & A_{02} \\ a_{10}^T & \alpha_{11} & a_{12}^T \\ \hline A_{20} & a_{21} & A_{22} \end{array} \right), \left(\begin{array}{c} x_T \\ x_B \end{array} \right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ x_2 \end{array} \right), \left(\begin{array}{c} y_T \\ y_B \end{array} \right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ y_2 \end{array} \right)$
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where A_{BR} is 0×0 , x_B has 0 rows, y_B has 0 rows

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

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

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

$$\psi_1 := \alpha_{11} \chi_1 + a_{21}^T x_2 + \psi_1$$

$$y_2 := a_{21} \chi_1 + y_2$$

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

endwhile