C4	Alexanithers and Are the
Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} \}$
4	$A \to \left(\frac{A_T}{A_B}\right), y \to \left(\frac{y_T}{y_B}\right)$ where A_T has 0 rows, y_T has 0 rows
2	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right\}$
3	while $m(A_T) < m(A)$ do
2,3	$\left\{ \left(\frac{y_T}{y_B}\right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B}\right) \land m(A_T) < m(A) \right\}$
5a	$ \begin{pmatrix} A_T \\ A_B \end{pmatrix} \to \begin{pmatrix} A_0 \\ a_1^T \\ A_2 \end{pmatrix}, \begin{pmatrix} y_T \\ y_B \end{pmatrix} \to \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} $ where a_1 has 1 row, ψ_1 has 1 row
6	$ \left\{ \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} A_0 x + \widehat{y}_0 \\ \widehat{\psi}_1 \\ \widehat{y}_2 \end{pmatrix} \right\} $
8	$\psi_1 := a_1^T x + \psi_1$
7	$ \left\{ \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} A_0 x + \widehat{y}_0 \\ a_1^T x + \widehat{\psi}_1 \\ \widehat{y}_2 \end{pmatrix} \right\} $
5b	$\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$
2	$\left\{ \qquad \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right\}$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$
1b	$\{y = Ax + \widehat{y} $

Step	Algorithm: $y := Ax + y$
1a	{
4	where
2	
3	while do
2,3	$\left\{ \left\{ \right. \right. \right.$
5a	where
6	
8	
7	
5b	
2	
	endwhile
2,3	$\left\{ \begin{array}{ccc} & & & \\ & & & \\ & & & \\ \end{array} \right.$
1b	{

Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} $
4	where
2	
3	while do
2,3	
5a	where
6	
8	
7	
5b	
2	
	endwhile
2,3	$\left\{ \qquad \qquad \land \neg (\qquad \qquad) \right.$
1b	$\{y = Ax + \widehat{y} $

Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} $
4	where
2	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right\}$
3	while do
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \wedge \right\}$
5a	where
6	
8	
7	
5b	
2	$\left\{ \qquad \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right.$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg () \right\}$
1b	$\{y = Ax + \widehat{y} $

Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} $
4	where
2	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right\}$
3	while $m(A_T) < m(A)$ do
2,3	$\left\{ egin{array}{c} \left(rac{y_T}{y_B} ight) = \left(rac{A_T x + \widehat{y}_T}{\widehat{y}_B} ight) \wedge m(A_T) < m(A) \end{array} ight.$
5a	where
6	
8	
7	
5b	
2	$\left\{ \qquad \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right.$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$
1b	$\{y = Ax + \widehat{y} $

Step	Algorithm: $y := Ax + y$	
1a	$\{y=\widehat{y}$	}
4	$A o \left(\frac{A_T}{A_B}\right), y o \left(\frac{y_T}{y_B}\right)$	
	where A_T has 0 rows, y_T has 0 rows	\neg
2	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right.$	
3	while $m(A_T) < m(A)$ do	
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land m(A_T) < m(A) \right\}$	
5a		
	where	
6		}
8		
]
7		}
5b		
0	$\left\{ \left(\frac{y_T}{y_T} \right) = \left(\frac{A_T x + \hat{y}_T}{y_T} \right) \right\}$	
2	$\left(\begin{array}{c} \overline{y_B} \end{array}\right) = \overline{\hat{y}_B}$	
	endwhile	
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$	
1b		}
		_

Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} \}$
4	$A \to \left(\frac{A_T}{A_B}\right), y \to \left(\frac{y_T}{y_B}\right)$ where A_T has 0 rows, y_T has 0 rows
2	$\left\{ \begin{pmatrix} y_T \\ y_B \end{pmatrix} = \begin{pmatrix} A_T x + \widehat{y}_T \\ \widehat{y}_B \end{pmatrix} \right\}$
3	while $m(A_T) < m(A)$ do
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land m(A_T) < m(A) \right\}$
5a	$ \left(\frac{A_T}{A_B}\right) \to \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \to \left(\frac{y_0}{\psi_1}\right) $ where a_1 has 1 row, ψ_1 has 1 row
6	
8	
7	
5b	$\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$
2	$\left\{ \qquad \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right.$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$
1b	$\{y = Ax + \widehat{y} $

Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} $
4	$A o \left(\frac{A_T}{A_B}\right), y o \left(\frac{y_T}{y_B}\right)$
2	where A_T has 0 rows, y_T has 0 rows $ \left\{ \begin{pmatrix} y_T \\ y_B \end{pmatrix} = \begin{pmatrix} A_T x + \hat{y}_T \\ \widehat{y}_B \end{pmatrix} \right\} $
3	while $m(A_T) < m(A)$ do
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land m(A_T) < m(A) \right\}$
5a	$ \begin{pmatrix} A_T \\ A_B \end{pmatrix} \to \begin{pmatrix} A_0 \\ a_1^T \\ A_2 \end{pmatrix}, \begin{pmatrix} y_T \\ y_B \end{pmatrix} \to \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} $ where a_1 has 1 row, ψ_1 has 1 row
6	$\left\{ \begin{array}{c} \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} A_0 x + \widehat{y}_0 \\ \widehat{\psi}_1 \\ \widehat{y}_2 \end{pmatrix} \right.$
8	
7	
5b	$\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$
2	$\left\{ egin{array}{c} \left(rac{y_T}{y_B} ight) = \left(rac{A_T x + \widehat{y}_T}{\widehat{y}_B} ight) \end{array} ight.$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$
1b	$\{y = Ax + \hat{y} $

1a $\{y = \widehat{y}\}$ 4 $A \to \left(\frac{A_T}{A_B}\right), y \to \left(\frac{y_T}{y_B}\right)$ where A_T has 0 rows, y_T has 0 rows 2 $\left\{\left(\frac{y_T}{y_B}\right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B}\right)\right\}$	
where A_T has 0 rows, y_T has 0 rows	}
3 while $m(A_T) < m(A)$ do	
$2,3 \left\{ \left(\frac{y_T}{y_B}\right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B}\right) \land m(A_T) < m(A) \right\}$	
5a $\left(\frac{A_T}{A_B}\right) \to \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \to \left(\frac{y_0}{\psi_1}\right)$ where a_1 has 1 row, ψ_1 has 1 row	
$6 \left\{ \begin{array}{c} y_0 \\ \psi_1 \\ y_2 \end{array} \right\} = \begin{pmatrix} A_0 x + \widehat{y}_0 \\ \widehat{\psi}_1 \\ \widehat{y}_2 \end{pmatrix}$	
8	
$7 \qquad \left\{ \qquad \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} A_0 x + \widehat{y}_0 \\ a_1^T x + \widehat{\psi}_1 \\ \widehat{y}_2 \end{pmatrix} \right.$	
5b $\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$	
$2 \qquad \left\{ \qquad \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \right.$	
endwhile	
$2,3 \left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$	
$1b \{y = Ax + \widehat{y}$	}

Step	Algorithm: $y := Ax + y$
1a	$\{y = \widehat{y} $
4	$A o \left(\frac{A_T}{A_B}\right), y o \left(\frac{y_T}{y_B}\right)$
	where A_T has 0 rows, y_T has 0 rows
2	$\left\{ \left(rac{y_T}{y_B} ight) = \left(rac{A_T x + \widehat{y}_T}{\widehat{y}_B} ight)$
3	while $m(A_T) < m(A)$ do
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land m(A_T) < m(A) \right\}$
5a	$ \left(\frac{A_T}{A_B}\right) \to \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \to \left(\frac{y_0}{\psi_1}\right) $ where a has 1 raw a' has 1 raw
	where a_1 has 1 row, ψ_1 has 1 row $(A_2 x + \widehat{y}_2)$
6	$\left\{egin{array}{c} \left(egin{array}{c} y_0 \ \psi_1 \ y_2 \end{array} ight) = \left(egin{array}{c} A_0 x + \widehat{y}_0 \ \widehat{\psi}_1 \ \widehat{y}_2 \end{array} ight) \end{array} ight.$
8	$\psi_1 := a_1^T x + \psi_1$
7	$ \left\{ \begin{pmatrix} y_0 \\ \psi_1 \\ y_2 \end{pmatrix} = \begin{pmatrix} A_0 x + \widehat{y}_0 \\ a_1^T x + \widehat{\psi}_1 \\ \widehat{y}_2 \end{pmatrix} \right\} $
5b	$\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$
2	$\left\{ egin{array}{c} \left(rac{y_T}{y_B} ight) = \left(rac{A_T x + \widehat{y}_T}{\widehat{y}_B} ight) \end{array} ight.$
	endwhile
2,3	$\left\{ \left(\frac{y_T}{y_B} \right) = \left(\frac{A_T x + \widehat{y}_T}{\widehat{y}_B} \right) \land \neg (m(A_T) < m(A)) \right\}$
1b	$\{y = Ax + \widehat{y} $

Algorithm: $y := Ax + y$
$A \to \left(\frac{A_T}{A_B}\right), y \to \left(\frac{y_T}{y_B}\right)$ where A_T has 0 rows, y_T has 0 rows
while $m(A_T) < m(A)$ do
$ \left(\frac{A_T}{A_B}\right) \to \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \to \left(\frac{y_0}{\psi_1}\right) $ where a_1 has 1 row, ψ_1 has 1 row
$\psi_1 := a_1^T x + \psi_1$
$\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$
endwhile

Algorithm: y := Ax + y

$$A \to \left(\frac{A_T}{A_B}\right), y \to \left(\frac{y_T}{y_B}\right)$$

where A_T has 0 rows, y_T has 0 rows while $m(A_T) < m(A)$ do

$$\left(\frac{A_T}{A_B}\right) \to \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \to \left(\frac{y_0}{\psi_1}\right)$$

$$\left(\frac{y_0}{\psi_1}\right) \to \left(\frac{y_0}{\psi_2}\right)$$

where a_1 has 1 row, ψ_1 has 1 row

$$\psi_1 := a_1^T x + \psi_1$$

$$\left(\frac{A_T}{A_B}\right) \leftarrow \left(\frac{A_0}{a_1^T}\right), \left(\frac{y_T}{y_B}\right) \leftarrow \left(\frac{y_0}{\psi_1}\right)$$

endwhile