Step	Algorithm: $A := xy^T + A$
1a	$\{A = \widehat{A}\}$
4	$y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$, $A \rightarrow \left(\begin{array}{c\|c} A_L & A_R \end{array}\right)$ where y_T has 0 rows, A_L has 0 columns
2	$\left\{\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right)\right\}$
3	while $m(y_T) < m(y)$ do
2,3	$\left\{\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge m(y_T) < m(y)\right\}$
5a	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$, $\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} A_0 & a_1 & A_2 \end{array}\right)$ where ψ_1 has 1 row, a_1 has 1 column
6	$\left\{\left(\begin{array}{ccc} A_0 & a_1 & A_2 \end{array}\right) = \left(\begin{array}{ccc} xy_0^T + \widehat{A}_0 & \widehat{a}_1 & \widehat{A}_2 \end{array}\right)\right\}$
8	$a_1 := \psi_1 x + a_1$
7	$\left\{\left(\begin{array}{ccc} A_0 & a_1 & A_2 \end{array}\right) = \left(\begin{array}{ccc} xy_0^T + \widehat{A}_0 & \psi_1 x + \widehat{a}_1 & \widehat{A}_2 \end{array}\right)\right\}$
5b	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$, $A \rightarrow \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} A_0 & a_1 & A_2 \end{array}\right)$
2	$\left\{\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right)\right\}$
	endwhile
2,3	$\left\{\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge \neg(m(y_T) < m(y))\right\}$
1b	$\{A = xy^T + A\}$

Step	Algorithm: $A := xy^T + A$
1a	$\{ \qquad \}$
4	where
2	$\left\{ \qquad \right\}$
3	while do
2,3	$\left\{ \qquad \wedge \qquad \right\}$
5a	where
6	$\left\{ \qquad \right\}$
8	
7	$\left\{ \qquad \right\}$
5b	
2	$\left\{ \qquad \right\}$
	endwhile
2,3	$\left\{ \qquad \wedge \neg(\qquad) \qquad \right\}$
1b	$\{ \qquad \}$

Step	Algorithm: $A := xy^T + A$
1a	$\{ A = \widehat{A} \}$
4	where
2	$\{ \}$
3	while do
2,3	$\{ \wedge \}$
5a	where
6	$\{ \}$
8	
7	$\{ \}$
5b	
2	$\{ \}$
	endwhile
2,3	$\{ \wedge \neg( ) \}$
1b	$\{ A = xy^T + A \}$

Step	Algorithm: $A := xy^T + A$
1a	$\{A = \widehat{A}$ $\}$
4	where
2	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \right\}$
3	while do
2,3	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \wedge \right\}$
5a	where
6	$\{ \}$
8	
7	$\{ \}$
5b	
2	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \right\}$
	endwhile
2,3	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \wedge \neg(\quad) \right\}$
1b	$\{A = xy^T + A$ $\}$

Step	Algorithm: $A := xy^T + A$
1a	$\{ A = \widehat{A} \}$
4	where
2	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \right\}$
3	while $m(y_T) < m(y)$ do
2,3	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \wedge m(y_T) < m(y) \right\}$
5a	where
6	$\{ \}$
8	
7	$\{ \}$
5b	
2	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \right\}$
	endwhile
2,3	$\left\{ \left(A_L \,\middle\|\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\|\, \widehat{A}_R \right) \wedge \neg(m(y_T) < m(y)) \right\}$
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Step	Algorithm: $A := xy^T + A$
1a	$\{A = \widehat{A} \quad \}$
4	$y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$, $A \rightarrow \left(\begin{array}{c\|c} A_L & A_R \end{array}\right)$ where y_T has 0 rows, A_L has 0 columns
2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \right\}$
3	while $m(y_T) < m(y)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge m(y_T) < m(y) \right\}$
5a	where
6	$\{ \quad \}$
8	
7	$\{ \quad \}$
5b	
2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge \neg(m(y_T) < m(y)) \right\}$
1b	$\{A = xy^T + A \quad \}$

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2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \right\}$
3	while $m(y_T) < m(y)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge m(y_T) < m(y) \right\}$
5a	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$, $\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} A_0 & a_1 & A_2 \end{array}\right)$ where ψ_1 has 1 row, a_1 has 1 column
6	$\{ \}$
8	
7	$\{ \}$
5b	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$, $A \rightarrow \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} A_0 & a_1 & A_2 \end{array}\right)$
2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge \neg(m(y_T) < m(y)) \right\}$
1b	$\{ A = xy^T + A \}$

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1a	$\{ A = \widehat{A} \}$
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2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \right\}$
3	while $m(y_T) < m(y)$ do
2,3	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge m(y_T) < m(y) \right\}$
5a	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$, $\left(\begin{array}{c\|c} A_L & A_R \end{array}\right) \rightarrow \left(\begin{array}{c\|cc} A_0 & a_1 & A_2 \end{array}\right)$ where ψ_1 has 1 row, a_1 has 1 column
6	$\left\{ \left(\begin{array}{ccc} A_0 & a_1 & A_2 \end{array}\right) = \left(\begin{array}{ccc} xy_0^T + \widehat{A}_0 & \widehat{a}_1 & \widehat{A}_2 \end{array}\right) \right\}$
8	
7	$\{ \}$
5b	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$, $A \rightarrow \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{cc\|c} A_0 & a_1 & A_2 \end{array}\right)$
2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \right\}$
	endwhile
2,3	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array}\right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array}\right) \wedge \neg(m(y_T) < m(y)) \right\}$
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2	$\left\{ \left(\begin{array}{c\|c} A_L & A_R \end{array} \right) = \left(\begin{array}{c\|c} xy_T^T + \widehat{A}_L & \widehat{A}_R \end{array} \right) \right\}$
3	while $m(y_T) < m(y)$ do
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5a	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array} \right)$, $\left(\begin{array}{c\|c} A_L & A_R \end{array} \right) \rightarrow \left(\begin{array}{c\|cc} A_0 & a_1 & A_2 \end{array} \right)$ where ψ_1 has 1 row, a_1 has 1 column
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8	
7	$\left\{ \left(\begin{array}{ccc} A_0 & a_1 & A_2 \end{array} \right) = \left(\begin{array}{ccc} xy_0^T + \widehat{A}_0 & \psi_1 x + \widehat{a}_1 & \widehat{A}_2 \end{array} \right) \right\}$
5b	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array} \right)$, $A \rightarrow \left(\begin{array}{c\|c} A_L & A_R \end{array} \right) \leftarrow \left(\begin{array}{cc\|c} A_0 & a_1 & A_2 \end{array} \right)$
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Step	Algorithm: $A := xy^T + A$
1a	$\{A = \widehat{A}$ $\}$
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2	$\left\{ \left(A_L \,\middle\vert\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\vert\, \widehat{A}_R \right) \right\}$
3	while $m(y_T) < m(y)$ do
2,3	$\left\{ \left(A_L \,\middle\vert\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\vert\, \widehat{A}_R \right) \wedge m(y_T) < m(y) \right\}$
5a	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$, $\left(A_L \,\middle\vert\, A_R \right) \rightarrow \left(A_0 \,\middle\vert\, a_1 \;\; A_2 \right)$ where ψ_1 has 1 row, a_1 has 1 column
6	$\left\{ \left(A_0 \;\; a_1 \;\; A_2 \right) = \left(xy_0^T + \widehat{A}_0 \;\; \widehat{a}_1 \;\; \widehat{A}_2 \right) \right\}$
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5b	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$, $A \rightarrow \left(A_L \,\middle\vert\, A_R \right) \leftarrow \left(A_0 \;\; a_1 \,\middle\vert\, A_2 \right)$
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	endwhile
2,3	$\left\{ \left(A_L \,\middle\vert\, A_R \right) = \left(xy_T^T + \widehat{A}_L \,\middle\vert\, \widehat{A}_R \right) \wedge \neg(m(y_T) < m(y)) \right\}$
1b	$\{A = xy^T + A$ $\}$

	Algorithm: $A := xy^T + A$
	$y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right)$, $A \rightarrow \left(A_L \,\middle\|\, A_R \right)$ where y_T has 0 rows, A_L has 0 columns
	while $m(y_T) < m(y)$ do
	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array} \right)$, $\left(A_L \,\middle\|\, A_R \right) \rightarrow \left(A_0 \,\middle\|\, a_1 \;\; A_2 \right)$ where ψ_1 has 1 row, a_1 has 1 column
	$a_1 := \psi_1 x + a_1$
	$\left(\begin{array}{c} y_T \\ \hline y_B \end{array} \right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array} \right)$, $A \rightarrow \left(A_L \,\middle\|\, A_R \right) \leftarrow \left(A_0 \;\; a_1 \,\middle\|\, A_2 \right)$
	endwhile

Algorithm: $A := xy^T + A$

$$y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right), \; A \rightarrow \left(\begin{array}{c|c} A_L & A_R \end{array}\right)$$

where y_T has 0 rows, A_L has 0 columns

while $m(y_T) < m(y)$ **do**

$$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right), \; \left(\begin{array}{c|c} A_L & A_R \end{array}\right) \rightarrow \left(\begin{array}{c|cc} A_0 & a_1 & A_2 \end{array}\right)$$

where ψ_1 has 1 row, a_1 has 1 column

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

$$\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right), \; A \rightarrow \left(\begin{array}{c|c} A_L & A_R \end{array}\right) \leftarrow \left(\begin{array}{cc|c} A_0 & a_1 & A_2 \end{array}\right)$$

endwhile