Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha} \qquad\qquad\qquad\qquad \}$
4	$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where x_T has 0 rows, y_T has 0 rows
2	$\{\alpha = x_T^T y_T + \widehat{\alpha} \qquad\qquad \}$
3	while $m(x_T) < m(x)$ do
2,3	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x) \qquad \}$
5a	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$ where χ_1 has 1 row, ψ_1 has 1 row
6	$\{ \quad \alpha = x_0^T y_0 + \widehat{\alpha} \qquad\qquad \}$
8	$\quad \alpha := \chi_1 \times \psi_1 + \widehat{\alpha}$
7	$\{ \quad \alpha = x_0^T y_0 + \chi_1 \times \psi_1 + \widehat{\alpha} \qquad \}$
5b	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$
2	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \qquad\qquad \}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x)) \qquad \}$
1b	$\{\alpha = x^T y + \widehat{\alpha} \qquad\qquad \}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{$ $\}$
4	where
2	$\{$ $\}$
3	while do
2,3	$\{$ $\wedge$ $\}$
5a	where
6	$\{$ $\}$
8	
7	$\{$ $\}$
5b	
2	$\{$ $\}$
	endwhile
2,3	$\{$ $\wedge \neg($ $)$ $\}$
1b	$\{$ $\}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha}\}$
4	where
2	$\{ \quad \}$
3	while do
2,3	$\{ \quad \wedge \quad \}$
5a	where
6	$\{ \quad \}$
8	
7	$\{ \quad \}$
5b	
2	$\{ \quad \}$
	endwhile
2,3	$\{ \quad \wedge \neg(\quad) \quad \}$
1b	$\{\alpha = x^T y + \widehat{\alpha}\}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha}$ $\}$
4	where
2	$\{\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
3	while do
2,3	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha} \wedge$ $\}$
5a	where
6	$\{$ $\}$
8	
7	$\{$ $\}$
5b	
2	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg($ $)$ $\}$
1b	$\{\alpha = x^T y + \widehat{\alpha}$ $\}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha} \qquad \}$
4	where
2	$\{\alpha = x_T^T y_T + \widehat{\alpha} \qquad \}$
3	while $m(x_T) < m(x)$ do
2,3	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x) \qquad \}$
5a	where
6	$\{ \qquad \}$
8	
7	$\{ \qquad \}$
5b	
2	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \qquad \}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x)) \qquad \}$
1b	$\{\alpha = x^T y + \widehat{\alpha} \qquad \}$

Step	Algorithm: $[\alpha] := \textsc{sapdot\_unb\_var1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha}$ $\}$
4	$x \rightarrow \left(\frac{x_T}{x_B}\right)$, $y \rightarrow \left(\frac{y_T}{y_B}\right)$ where x_T has 0 rows, y_T has 0 rows
2	$\{\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
3	while $m(x_T) < m(x)$ do
2,3	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x)$ $\}$
5a	where
6	$\{$ $\}$
8	
7	$\{$ $\}$
5b	
2	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x))$ $\}$
1b	$\{\alpha = x^T y + \widehat{\alpha}$ $\}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha}$ $\}$
4	$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where x_T has 0 rows, y_T has 0 rows
2	$\{\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
3	while $m(x_T) < m(x)$ do
2,3	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x)$ $\}$
5a	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$ where χ_1 has 1 row, ψ_1 has 1 row
6	$\{$ $\}$
8	
7	$\{$ $\}$
5b	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$
2	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x))$ $\}$
1b	$\{\alpha = x^T y + \widehat{\alpha}$ $\}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha} \quad\quad \}$
4	$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where x_T has 0 rows, y_T has 0 rows
2	$\{\alpha = x_T^T y_T + \widehat{\alpha} \quad\quad \}$
3	while $m(x_T) < m(x)$ do
2,3	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x) \quad\quad \}$
5a	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$ where χ_1 has 1 row, ψ_1 has 1 row
6	$\{ \quad \alpha = x_0^T y_0 + \widehat{\alpha} \quad\quad \}$
8	
7	$\{ \quad\quad \}$
5b	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$
2	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \quad\quad \}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x)) \quad\quad \}$
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Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha} \qquad \}$
4	$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where x_T has 0 rows, y_T has 0 rows
2	$\{\alpha = x_T^T y_T + \widehat{\alpha} \qquad \}$
3	while $m(x_T) < m(x)$ do
2,3	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x) \qquad \}$
5a	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$ where χ_1 has 1 row, ψ_1 has 1 row
6	$\{ \quad \alpha = x_0^T y_0 + \widehat{\alpha} \qquad \}$
8	
7	$\{ \quad \alpha = x_0^T y_0 + \chi_1 \times \psi_1 + \widehat{\alpha} \qquad \}$
5b	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$
2	$\{ \quad \alpha = x_T^T y_T + \widehat{\alpha} \qquad \}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x)) \qquad \}$
1b	$\{\alpha = x^T y + \widehat{\alpha} \qquad \}$

Step	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
1a	$\{\alpha = \widehat{\alpha}$ $\}$
4	$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right)$, $y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where x_T has 0 rows, y_T has 0 rows
2	$\{\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
3	while $m(x_T) < m(x)$ do
2,3	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha} \wedge m(x_T) < m(x)$ $\}$
5a	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$ where χ_1 has 1 row, ψ_1 has 1 row
6	$\{$ $\alpha = x_0^T y_0 + \widehat{\alpha}$ $\}$
8	$\alpha := \chi_1 \times \psi_1 + \widehat{\alpha}$
7	$\{$ $\alpha = x_0^T y_0 + \chi_1 \times \psi_1 + \widehat{\alpha}$ $\}$
5b	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right)$, $\left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$
2	$\{$ $\alpha = x_T^T y_T + \widehat{\alpha}$ $\}$
	endwhile
2,3	$\{\alpha = x_T^T y_T + \widehat{\alpha} \wedge \neg(m(x_T) < m(x))$ $\}$
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	Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$
	$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right), y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$ where x_T has 0 rows, y_T has 0 rows
	while $m(x_T) < m(x)$ do
	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$ where χ_1 has 1 row, ψ_1 has 1 row
	$\alpha := \chi_1 \times \psi_1 + \widehat{\alpha}$
	$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right), \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$
	endwhile

Algorithm: $[\alpha] := \text{SAPDOT\_UNB\_VAR1}(x, y, \alpha)$

$$x \rightarrow \left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right), \; y \rightarrow \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right)$$

where x_T has 0 rows, y_T has 0 rows

while $m(x_T) < m(x)$ **do**

$$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \rightarrow \left(\begin{array}{c} x_0 \\ \hline \chi_1 \\ x_2 \end{array}\right), \; \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \rightarrow \left(\begin{array}{c} y_0 \\ \hline \psi_1 \\ y_2 \end{array}\right)$$

where χ_1 has 1 row, ψ_1 has 1 row

$$\alpha := \chi_1 \times \psi_1 + \widehat{\alpha}$$

$$\left(\begin{array}{c} x_T \\ \hline x_B \end{array}\right) \leftarrow \left(\begin{array}{c} x_0 \\ \chi_1 \\ \hline x_2 \end{array}\right), \; \left(\begin{array}{c} y_T \\ \hline y_B \end{array}\right) \leftarrow \left(\begin{array}{c} y_0 \\ \psi_1 \\ \hline y_2 \end{array}\right)$$

endwhile