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

Compute $\alpha := x^T y + \alpha$ where x, y are vectors of size n

$i = 0$

while $i < n$ **do**

$\alpha := \alpha + \chi_i \psi_i$

$i := i + 1$

enddo

Compute $\alpha := x^T y + \alpha$ where x, y are vectors of size n

$i = n - 1$

while $i \geq 0$ **do**

$\alpha := \alpha + \chi_i \psi_i$

$i := i - 1$

enddo

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	