Input: Values $(x_i, y_i)_{i=0}^{n-1}$, errors $(\sigma_{xi}, \sigma_{yi})_{i=0}^{n-1}$, correlations $|r| \leq 1$ between the errors, initial approximation for a_1, tolerance ε

for $i = 0$ **to** $n - 1$ **do**
  $w_{xi} = 1/\sigma_{xi}^2$;
  $w_{yi} = 1/\sigma_{yi}^2$;
end
while *(* $|$ difference between consecutive a_1 $|$ $> \varepsilon$ *)* **do**
  for $i = 0$ **to** $n - 1$ **do**
    $W_i = w_{xi} w_{yi} \,/\, [w_{xi} + a_1^2 w_{yi} - 2 a_1 r \sqrt{w_{xi} w_{yi}}]$;
  end
  $\overline{x} = \sum_i W_i x_i / \sum_i W_i$;
  $\overline{y} = \sum_i W_i y_i / \sum_i W_i$;
  for $i = 0$ **to** $n - 1$ **do**
    $u_i = x_i - \overline{x}$;
    $v_i = y_i - \overline{y}$;
    $\beta_i = W_i \left[u_i / w_{yi} + a_1 v_i / w_{xi} - (a_1 u_i + v_i) r / \sqrt{w_{xi} w_{yi}} \right]$;
  end
  $a_1 = \sum_i W_i \beta_i v_i / \sum_i W_i \beta_i u_i$;   // new estimate for a_1
end
$a_0 = \overline{y} - a_1 \overline{x}$;
for $i = 0$ **to** $n - 1$ **do**
  $\xi_i = \overline{x} + \beta_i$;
end
$\overline{\xi} = \sum_i W_i \xi_i / \sum_i W_i$;
for $i = 0$ **to** $n - 1$ **do**
  $\eta_i = \xi_i - \overline{\xi}$;
end
$\sigma^2(a_1) = 1 / \sum_i W_i \eta_i^2$;
$\sigma^2(a_0) = 1 / \sum_i W_i + \overline{\xi}^2 \sigma^2(a_1)$;
Output: a_0, a_1, $\sigma(a_0)$, $\sigma(a_1)$