$T: a \leftarrow a + b, \quad b \leftarrow a$

$T_{pq}: a \leftarrow bq + aq + ap, \quad b \leftarrow bp + aq$

$T_{pq}(a, b) = ((bq + aq + ap), (bp + aq))$

$T_{pq}(T_{pq}(a,b))$

$= T_{pq}((bq + aq + ap), (bp + aq))$

$= (((bp + aq)q + (bq + aq + ap)q + (bq + aq + ap)p),$
$\quad ((bp + aq)p + (bq + aq + ap)q))$

$= ((bpq + aq^2 + bq^2 + aq^2 + apq + bpq + apq + ap^2),$
$\quad (bp^2 + apq + bq^2 + aq^2 + apq))$

$= ((2bpq + 2aq^2 + 2apq + bq^2 + ap^2),$
$\quad (2apq + aq^2 + bq^2 + bp^2))$

$= ((b(2pq + q^2) + a(2pq + q^2) + a(p^2 + q^2)),$
$\quad (b(q^2 + p^2) + a(2pq + q^2))) \quad ①$

If $p' = p^2 + q^2 \quad \& \quad q' = q^2 + 2pq$

then $T_{pq}(T_{pq}(a,b)) = ((bq' + aq' + ap'), (bp' + aq'))$

and $T_{p'q'}(a,b) = ((bq' + aq' + ap'), (bp' + aq'))$

$= ①$