Problema 1.19.

Solução:

$$T(a,b) = (bq + aq + ap, bp + aq)$$
$$T(T(a,b)) = [q(bp + aq) + (p + q)(bq + aq + ap),$$
$$p(bp + aq) + q(bq + aq + ap)]$$
$$= [bqp + aq^2 + pbq + aqp + ap^2$$
$$+ bq^2 + aq^2 + aqp,$$
$$bp^2 + aqp + bq^2 + aq^2 + aqp]$$
$$= [b(2qp + q^2) + a(2qp + q^2) + a(p^2 + q^2),$$
$$b(p^2 + q^2) + a(2qp + q^2)]$$
$$= (bq' + aq' + ap', bp' + aq')$$
$$\therefore (p', q') = (p^2 + q^2, q^2 + 2qp)$$

□