[mex84] Check the canonicity of coordinate transformations

(a) The relations $q = P\cos Q,\ p = P\sin Q$ describe a transformation between Cartesian coordiantes and polar coordinates in the phase space of a system with one degree of freedom. Determine whether this transformation is canonical or not. (b) Determine the values of the parameters α, β the linear transformation $Q = q + \alpha p,\ P = p + \beta q$ is canonical. (c) Verify that the transformation $Q = \sqrt{p - t^2},\ P = -2q\sqrt{p - t^2}$ to be used in [mex83] is canonical.

Solution: