$\dot{H} - 2S$ è antisimmetrica

$S(q,\dot{q})\dot{q}$

$$\boxed{H(q)\ddot{q}} + c(q,\dot{q}) + \cancel{g(q)} = u$$

$$\ddot{q} = \boxed{H^{-1}(q)}\left[u - \cancel{c(q,\dot{q})} - \cancel{g(q)}\right]$$

$\dot{q} = 0$

$$p = H(q)\dot{q}$$

$$\dot{p} = H(q)\ddot{q} + \dot{H}(q)\dot{q} \qquad \dot{H} = S + S^T$$

$$= \boxed{H(q)\ddot{q}} + S(q,\dot{q})\dot{q} + S^T(q,\dot{q})\dot{q}$$

$$= -u - \cancel{S(q,\dot{q})\dot{q}} + \cancel{S(q,\dot{q})\dot{q}} + S^T(q,\dot{q})\dot{q}$$

$K(\theta - q)$

$u(x) = u(\theta - q)$

$$H(q)\ddot{q} + c(q,\dot{q}) = K \cdot (\theta - q)$$

$$r = L\left[p - \int (S^T(q,\dot{q}) + r)\,dt\right]$$