

$$\left\{ \begin{array}{l} \ddot{y}_1 > 0, \dot{y}_1 > 0, y_1 < 0, \\ \ell_1 = q_1 \wedge \ddot{q}_1 > 0, \\ \ell_1 = q_1 \wedge \dot{q}_1 < 0. \end{array} \right.$$