

$$\ell = q \wedge \dot{q} = r^2 \dot{\theta} = 0 \Leftrightarrow q = 0.$$

- Right lobe: $\ell < 0, \dot{\theta} < 0$
 $(\textcolor{red}{\ell_1} < \textcolor{red}{0}, \textcolor{blue}{\ell_3} < \textcolor{blue}{0})$

- Left lobe: $\ell > 0, \dot{\theta} > 0$
 $(\textcolor{green}{\ell_2} > \textcolor{green}{0})$