

nonholonomic constraints

$$\sum a_{ke} dq_e = 0$$

↑ generalized coordinates

$$\Rightarrow \vec{a}_{ke} \perp \vec{dq}_e$$

⇒ constraint force should be given by the linear combination  $\sum \lambda_k a_{ke}$

$$EL \quad \frac{d}{dt} \frac{\partial L}{\partial \dot{q}_e} - \frac{\partial L}{\partial q_e} + \sum \lambda_k a_{ke} = 0$$