First-order principles Data-aided learning techniques $f = m\dot{v}$ $oldsymbol{ au} = oldsymbol{I}\dot{oldsymbol{\omega}} + oldsymbol{\omega} imes oldsymbol{I}oldsymbol{\omega}$ $v = \omega \times r + v_0$ $\dot{m{v}} = \dot{m{\omega}} imes m{r} + m{\omega} imes m{\omega} imes m{r} + \dot{m{v}}_0$ FOPnet◀