Newton - Euler Dynamics Technical Conclusion

① Problem : Given $\theta, \dot{\theta}, \ddot{\theta}$, calc τ ⇐ Inverse Dynamics

② Steps : Forward Propagation : Calc acc from base to tip

1. robot kinematics and mass, inertial for each link know
2. Given $\theta, \dot{\theta}, \ddot{\theta}$ for each link
3. Calc v, $\dot{v}$ for each Link's CoM, from $1 \to n$

Back Propagation : calc force & moment from tip to base

1. End effector force F_{n+1} know,
2. Calc τ_i for each joint, from $n \to 1$.

③ Comments : this iterative algorithm ↑ is specific for solve Inverse Dynamics Newton - Euler method could also generate Manipulator's Equation to calculate Forward Dynamics