MAE 163B / 263B – Dynamics of Robotic System

Project – Master Students

Newton-Euler Equations – Dynamics

MAE 263B (Graduate Class) – Solve All Parts

Note: Matlab's symbolic toolbox can be used to verify the analytical eruptions derived by hand

1. **Equations of Motion – Derivation** – Given the 3R manipulator architecture depicted in figure 1 and external force and external torque are applied on its end effector. Each link has a full 3x3 tensor of inertia

    a. Use the **Newton-Euler formulation** and derive the equations of motion of the manipulator
    b. Use the **Lagrange formulation** and derive the equations of motion of the manipulator

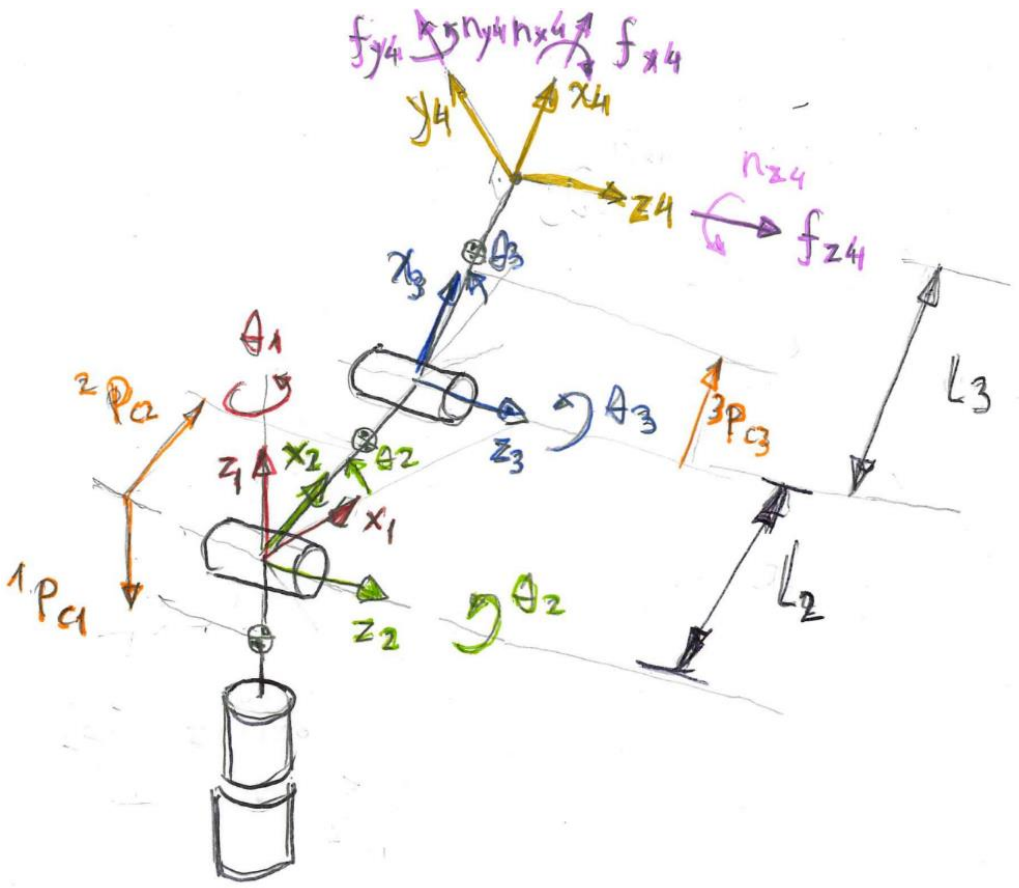

Figure 1 – 3R manipulator