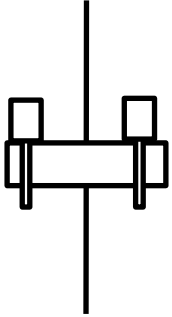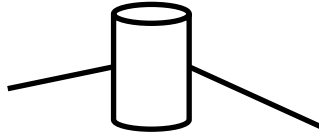Legend:

Fix joint

Rotating joint
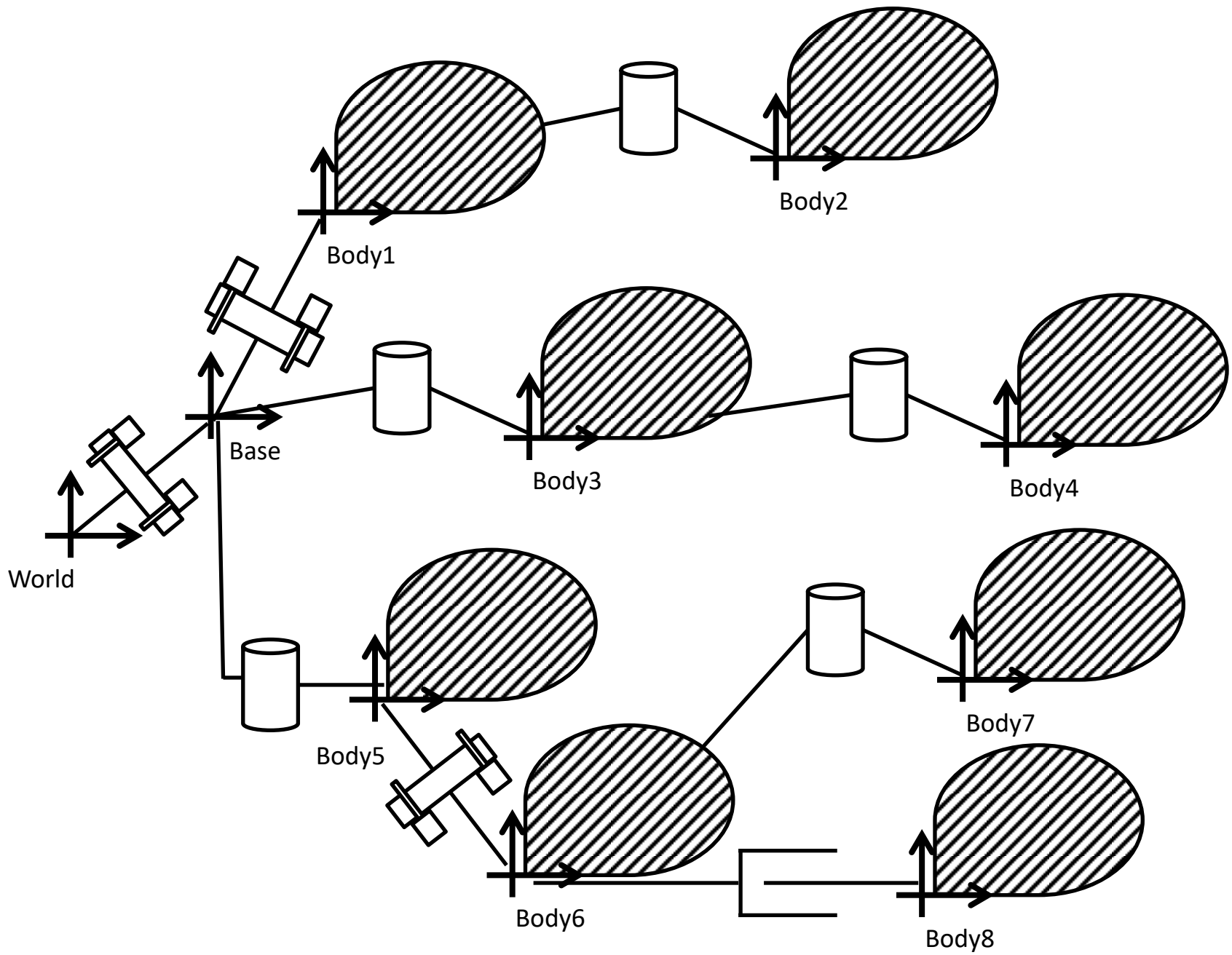
Traslating joint

Rigid body shape
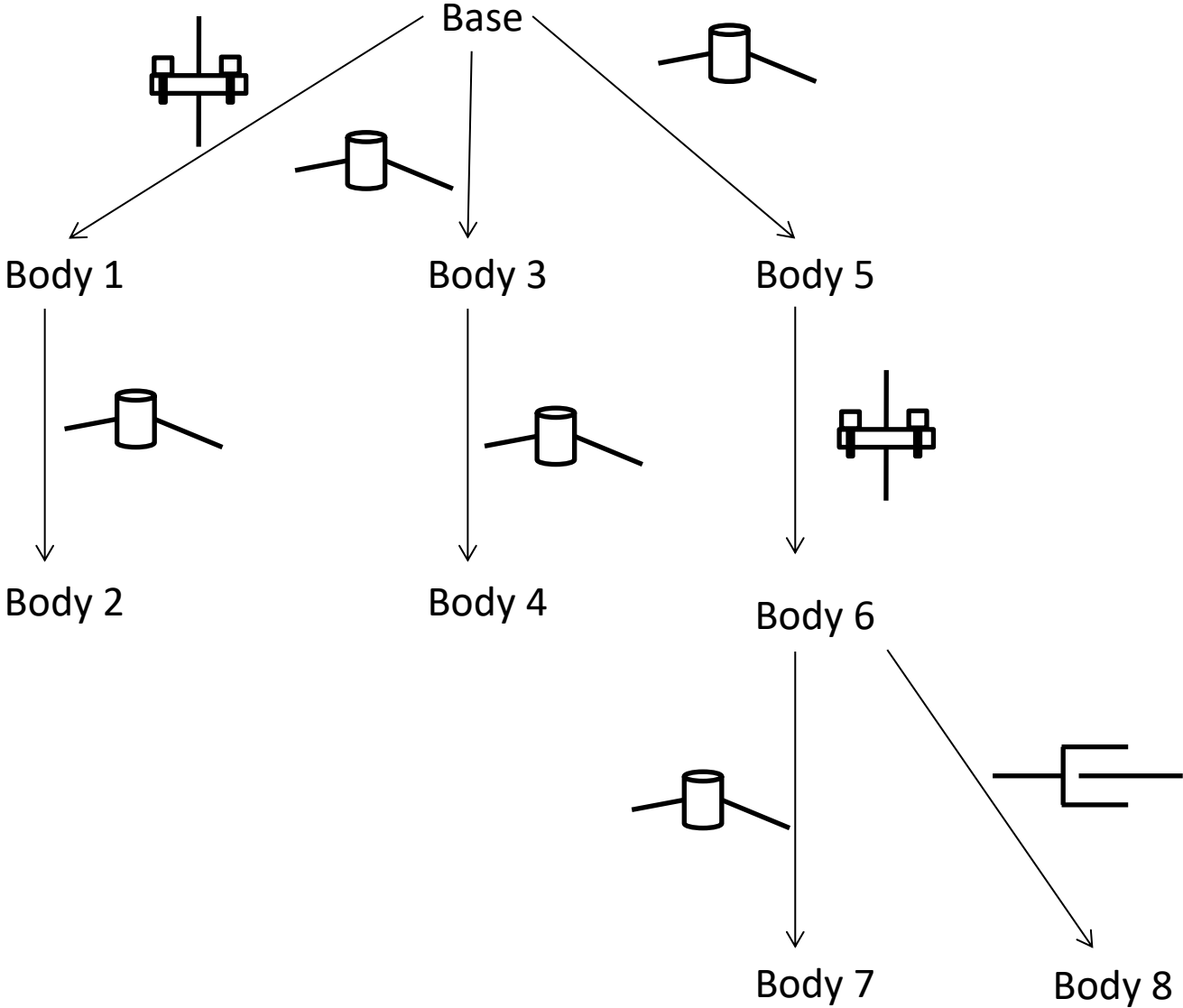
World

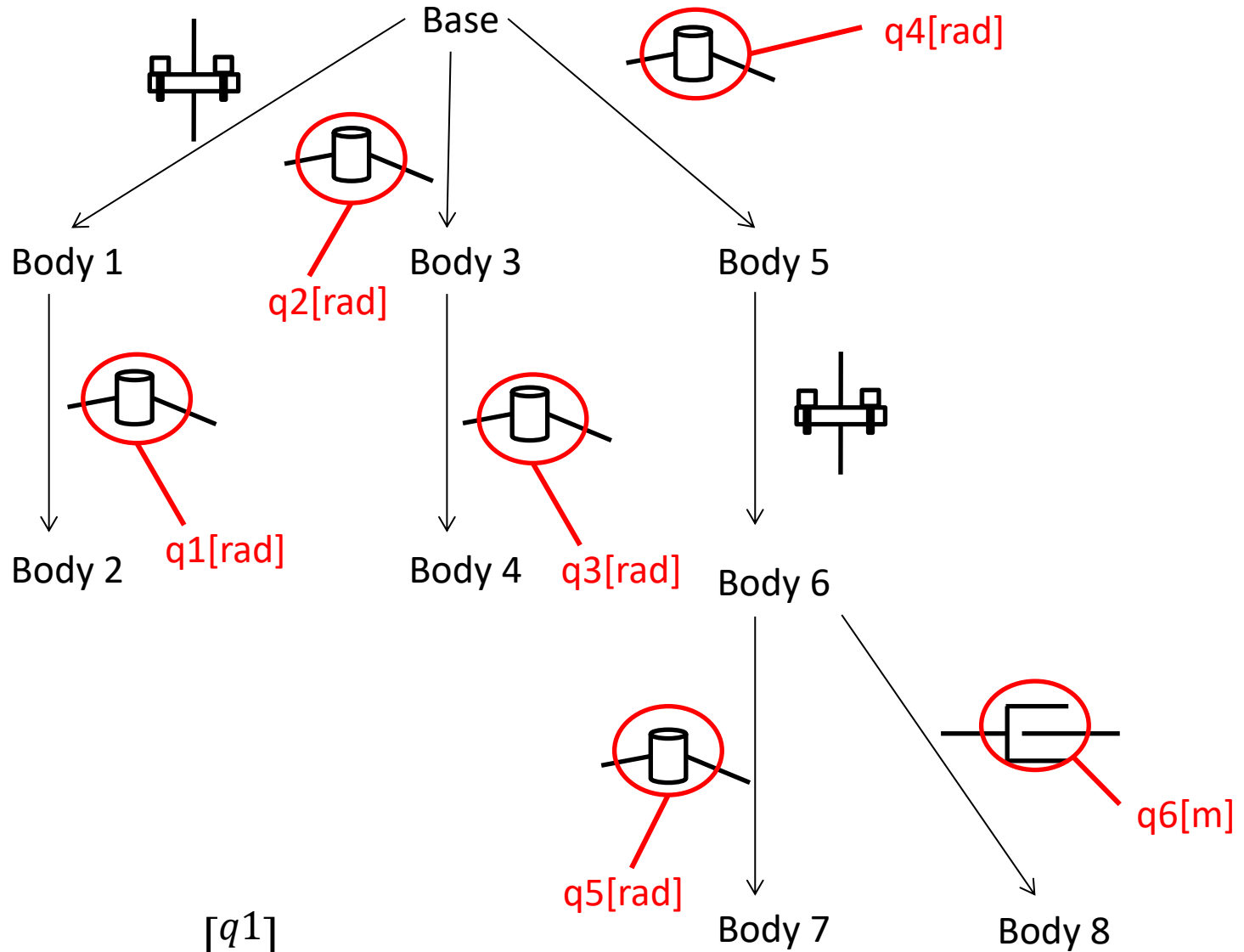Base

Body1

Body2

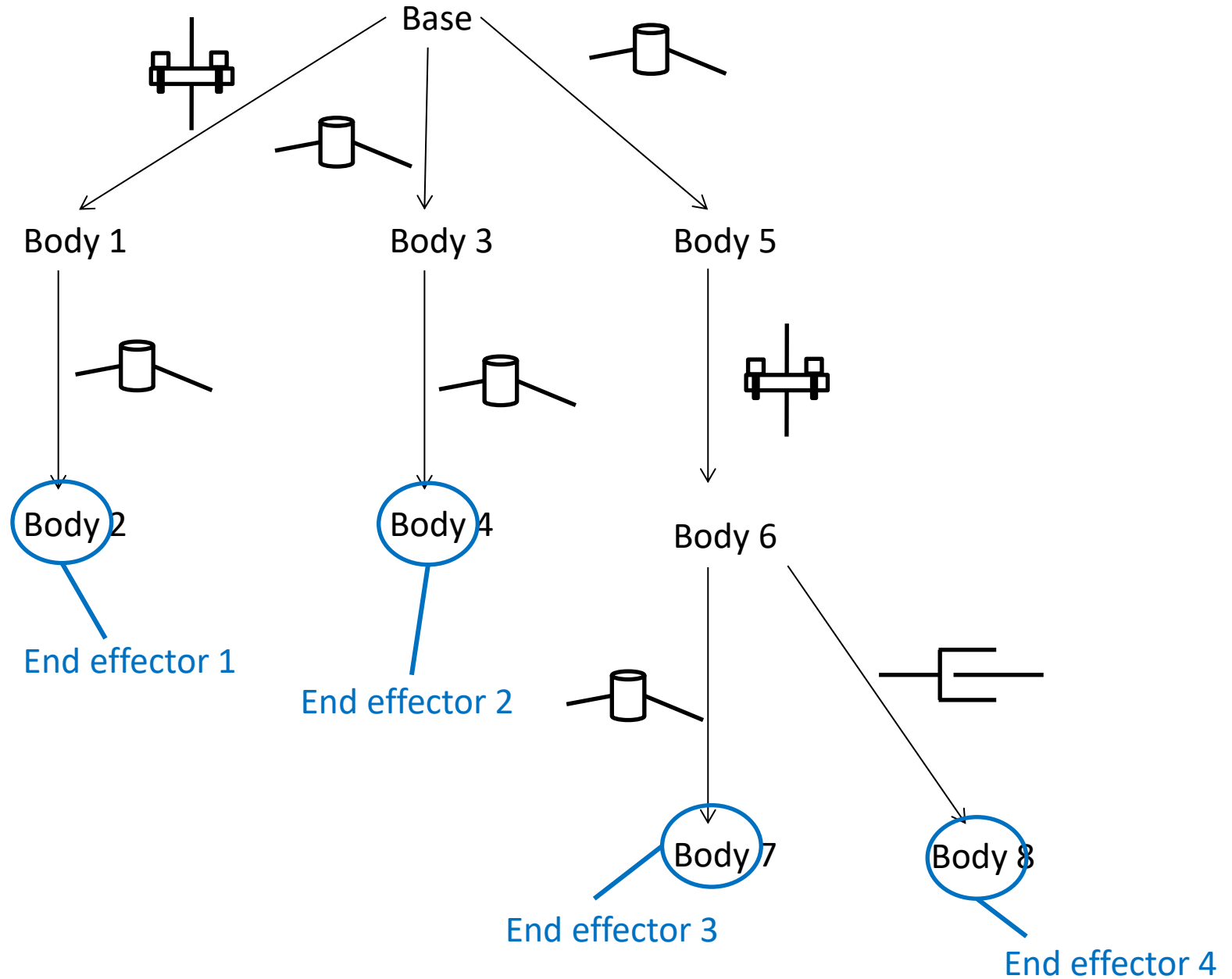Body3

Body4

Body5

Body6

Body7

Body8
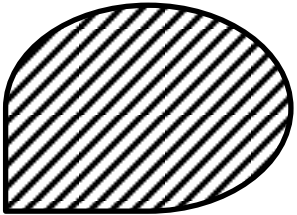
Kinematic hierarchy:

Kinematic hierarchy:

Pose vector: $Q = \begin{bmatrix} q1 \\ \vdots \\ q6 \end{bmatrix}$

Kinematic hierarchy:

XML description (val = values for that field):

```
<Mechanism>
        <Base tx='val' ty='val' tz='val' rx='val' ry='val' rz='val'></Base> !Optional, when not specified, all values are
assume to be 0
        <Body name='Body1' STL_path='… .stl' !Optional and relative to the XML file location >
                <Transf_fix tx='val' ty='val' tz='val' rx='val' ry='val' rz='val''></Transf_fix>
                <Body name='Body2' STL_path='… .stl'>
                        <Joint_rot gamma='val' z='val' x='val' alfa='val' ></Joint_rot > !q1. Denavit-
Hartenberg conventions are assumed. Z or gamma are the offset to consider (for traslational and rotational joints
respectively)
                </Body>
        </Body>
        <Body name='Body3' STL_path='… .stl' >
                <Joint_rot gamma='val' z='val' x='val' alfa='val' ></Joint_rot > !q2
                <Body name='Body4' STL_path='… .stl'>
                        <Joint_rot gamma='val' z='val' x='val' alfa='val' ></Joint_rot > !q3
                </Body>
        </Body>
        <Body name='Body5' STL_path='… .stl'>
                <Joint_rot gamma='val' z='val' x='val' alfa='val' ></Joint_rot > !q4
                <Body name='Body6' STL_path='… .stl'>
                        <Transf_fix tx='val' ty='val' tz='val' rx='val' ry='val' rz='val''></Transf_fix>
                        <Body name='Body7' STL_path='… .stl'>
                                <Joint_rot gamma='val' z='val' x='val' alfa='val' ></Joint_rot > !q5
                        </Body>
                        <Body name='Body8' STL_path='… .stl'>
                                < Joint_tras gamma='val' z='val' x='val' alfa='val' ></Joint_rot > !q6
                        </Body>
                </Body>
        </Body>
</Mechanism >
```

XML description (val = values for that field):

Automatic calibration: is done considering an xml file containing the positions of the end effectors for a certain number of poses (good practice is to use at least a number of poses equal to the d.o.f) and the value of Q that must correspond. The offsets of the joints are automatically recomputed. The calibration file must be compliant with the following format:

```
<Calib_file>
          <Pose> !use at least a number equal to the d.o.f. of Pose for the calibration
                    <EE_Pose x='val' y='val' z='val'></EE_Pose> !cartesian position of the first end effector
                                        ⋮
                    <EE_Pose x='val' y='val' z='val'></EE_Pose>
                    <Q_Pose q='val' q='val' ⋯  q='val'></Q_Pose>!These are the values of the pose (after
computing the right offset) to match with the specified end effector positions
          </Pose>
          ⋮
          <Pose>
                    <EE_Pose x='.' y='.' z='.'></EE_Pose>
                                        ⋮
                    <EE_Pose x='.' y='.' z='.'></EE_Pose>
                    <Q_Pose q='.' q='.' ⋯  q='.'></Q_Pose>
          </Pose>
</Calib_file>
```