## **Biped 6dof v1 Inertia Parameters**

|   | Biped Body   |                   |                  |
|---|--|-------------------|------------------|
| Mass [kg]   | 0.63446156   |                   |                  |
| Center of Mass Position [m]<br>with respect to the URDF<br>coordinate system. | X = -0.00052262<br>Y = -0.00076382<br>Z = 0.03367157 |                   |                  |
| Inertia [kg*m²]   | Lxx = 0.00134972                                     | Lxy = 0.00000210  | Lxz = 0.00027137 |
| with respect to the center of   | Lyx = 0.00000210                                     | Lyy = 0.00151870  | •                |
| mass aligned to the URDF  | Lzx = 0.00027137                                     | Lzy = -0.00001110 | Lzz = 0.00207283 |
| coordinate system.  |  |                   |                  |
| Screenshot  |  |                   |                  |

|   | Hip FE Right Side  | Hip FE Left Side   |
|---|--|--|
| Mass [kg]   | 0.14004412   | 0.14004265   |
| Center of Mass Position [m]<br>with respect to the URDF<br>coordinate system.             | X = 0.01708233<br>Y = 0.00447099<br>Z = -0.01095846  | X = 0.01708256<br>Y = -0.00446892<br>Z = -0.01095830   |
| Inertia [kg*m²] with respect to the center of mass aligned to the URDF coordinate system. | Lxx = 0.00007442<br>Lxy = -0.00000148<br>Lxz = 0.00002154<br>Lyx = -0.00000148<br>Lyy = 0.00013848<br>Lyz = 0.00001095<br>Lzx = 0.00002154<br>Lzy = 0.00001095<br>Lzz = 0.00009001 | Lxx = 0.00007443<br>Lxy = 0.00000148<br>Lxz = 0.00000148<br>Lyx = 0.00000148<br>Lyy = 0.00013847<br>Lyz = -0.00001096<br>Lzx = 0.00002154<br>Lzy = -0.00001096<br>Lzz = 0.00009002 |
| Screenshot  |  |  |

|   | Upper Leg Right Side   | Upper Leg Left Side  |
|---|--|--|
| Mass [kg]   | 0.15627530   | 0.15627530   |
| Center of Mass Position [m] with respect to the URDF coordinate system.                   | X = -0.00001312<br>Y = -0.01949046<br>Z = -0.11145002  | X = 0.00001312<br>Y = 0.01949046<br>Z = -0.11145002  |
| Inertia [kg*m²] with respect to the center of mass aligned to the URDF coordinate system. | Lxx = 0.00054578<br>Lxy = 0.000000000<br>Lxz = -0.00000007<br>Lyx = 0.00054759<br>Lyz = 0.00004703<br>Lzx = -0.00000007<br>Lzy = 0.0004703<br>Lzz = 0.00004703<br>Lzz = 0.00003216 | Lxx = 0.00054578<br>Lxy = 0.000000000<br>Lxz = 0.000000007<br>Lyx = 0.00000000<br>Lyy = 0.00054759<br>Lyz = -0.00004703<br>Lzx = 0.00000007<br>Lzy = -0.00004703<br>Lzz = 0.00003216 |
| Screenshot  |  |  |

|   | Lower Leg Right Side  | Lower Leg Left Side  |
|---|---|--|
| Mass [kg]   | 0.05746831  | 0.05746831   |
| Center of Mass Position [m]<br>with respect to the URDF<br>coordinate system.             | X = -0.00005422<br>Y = -0.00837604<br>Z = -0.13202657   | X = 0.00005422<br>Y = 0.00837604<br>Z = -0.13202657  |
| Inertia [kg*m²] with respect to the center of mass aligned to the URDF coordinate system. | Lxx = 0.00035375<br>Lxy = 0.00000000<br>Lxz = 0.000000013<br>Lyx = 0.000000000<br>Lyy = 0.00036756<br>Lyz = 0.00000474<br>Lzx = 0.00000013<br>Lzy = 0.00000474<br>Lzz = 0.000001657 | Lxx = 0.00035375<br>Lxy = 0.00000000<br>Lxz = -0.000000013<br>Lyx = 0.00036756<br>Lyz = -0.00000474<br>Lzx = -0.0000013<br>Lzy = -0.00000474<br>Lzz = 0.00001657 |
| Screenshot  |   |  |

| Motor Rotor Antigravity 4004 | Inertia [kg*m²]  |
|------------------------------|--|
|                              | $ \begin{aligned} Lxx &= 0.00000245 \ Lxy = 0.000000000 \ Lxz = 0.000000000 \\ Lyx &= 0.000000000 \ Lyy = 0.000000447 \ Lyz = 0.000000000 \\ Lzx &= 0.000000000 \ Lzy = 0.000000000 \ Lzz = 0.000000245 \end{aligned} $ The reflected inertia at the output joint is 81 times higher compared to the inertia of the motor rotor. For rotation around the motor axis only the Lyy value should be relevant. |