%% Contact and friction parameters

contact\_stiffness = 400/0.001; % Approximated at weight (N) / desired displacement (m)

contact\_damping = contact\_stiffness/10; % Tuned based on contact stiffness value

mu\_s = 0.9; % Static friction coefficient: Around that of rubber-asphalt

mu\_k = 0.8; % Kinetic friction coefficient: Lower than the static coefficient

mu\_vth = 0.1; % Friction velocity threshold (m/s)

height\_plane = 0.025;

plane\_z = height\_plane;

plane\_x = 3;

plane\_y = 50;

contact\_point\_radius = 0.0001; %m

%% Robot mechanical Parameters (m)

density = 1000;

leg\_width = 0.08;

lower\_leg\_length = 0.38;

upper\_leg\_length = 0.40;

foot\_x = 0.17;

foot\_y = 0.17;

foot\_z = 0.02;

torso\_width = 0.24;

torso\_length = 0.20;

torso\_height = 0.35;

torso\_offset\_height = 0;

torso\_offset\_length = 0;

world\_damping = 0; % Translational damping for 6-DOF joint [N/m]

world\_rot\_damping = 0; % Rotational damping for 6-DOF joint [N\*m/(rad/s)]

%% Initial conditions

% Height of the 6-DOF joint between the ground and robot torso

init\_height = lower\_leg\_length + upper\_leg\_length + torso\_offset\_height ...

+ foot\_z/2 + plane\_z/2;

% Joint angles [hip\_yaw, hip\_roll, hip\_pitch, knee, ankle\_pitch, ankle\_roll]

init\_angs\_R = zeros(6,1);

init\_angs\_L = zeros(6,1);

%% Robot joint parameters

joint\_damping = 1;

motion\_time\_constant = 0.001;

%% Joint controller parameters

hip\_servo\_kp = 12500;

hip\_servo\_ki = 3500;

hip\_servo\_kd = 100;

knee\_servo\_kp = 10000;

knee\_servo\_ki = 2750;

knee\_servo\_kd = 75;

ankle\_servo\_kp = 7500;

ankle\_servo\_ki = 2000;

ankle\_servo\_kd = 50;

deriv\_filter\_coeff = 1000;

max\_torque = 80;

%% Electric motor parameters

motor\_voltage = 24;

motor\_resistance = 8;

motor\_constant = 0.16;

motor\_inertia = 1e-5;

motor\_damping = 1e-5;

motor\_inductance = 250e-6;

gear\_ratio = 100;