%%% SetupBipedRobot.m

%%% Set biped robot structure of Figure 2.19, 2.20

%%% Field definition: Table 2.1 Link Parameters

global uLINK

ToDeg = 180/pi;

ToRad = pi/180;

UX = [1 0 0]';

UY = [0 1 0]';

UZ = [0 0 1]';

uLINK = struct('name','BODY' , 'm', 10, 'sister', 0, 'child', 2, 'b',[0 0 0.7]','a',UZ,'q',0);

uLINK(2) = struct('name','RLEG\_J0' , 'm', 5, 'sister', 8, 'child', 3, 'b',[0 -0.1 0]' ,'a',UZ,'q',0);

uLINK(3) = struct('name','RLEG\_J1' , 'm', 1, 'sister', 0, 'child', 4, 'b',[0 0 0]' ,'a',UX,'q',0);

uLINK(4) = struct('name','RLEG\_J2' , 'm', 5, 'sister', 0, 'child', 5, 'b',[0 0 0]' ,'a',UY,'q',0);

uLINK(5) = struct('name','RLEG\_J3' , 'm', 1, 'sister', 0, 'child', 6, 'b',[0 0 -0.3]' ,'a',UY,'q',0);

uLINK(6) = struct('name','RLEG\_J4' , 'm', 6, 'sister', 0, 'child', 7, 'b',[0 0 -0.3]' ,'a',UY,'q',0);

uLINK(7) = struct('name','RLEG\_J5' , 'm', 2, 'sister', 0, 'child', 0, 'b',[0 0 0 ]' ,'a',UX,'q',0);

uLINK(8) = struct('name','LLEG\_J0' , 'm', 5, 'sister', 0, 'child', 9, 'b',[0 0.1 0]' ,'a',UZ,'q',0);

uLINK(9) = struct('name','LLEG\_J1' , 'm', 1, 'sister', 0, 'child',10, 'b',[0 0 0]' ,'a',UX,'q',0);

uLINK(10)= struct('name','LLEG\_J2' , 'm', 5, 'sister', 0, 'child',11, 'b',[0 0 0]' ,'a',UY,'q',0);

uLINK(11)= struct('name','LLEG\_J3' , 'm', 1, 'sister', 0, 'child',12, 'b',[0 0 -0.3]' ,'a',UY,'q',0);

uLINK(12)= struct('name','LLEG\_J4' , 'm', 6, 'sister', 0, 'child',13, 'b',[0 0 -0.3]' ,'a',UY,'q',0);

uLINK(13)= struct('name','LLEG\_J5' , 'm', 2, 'sister', 0, 'child', 0, 'b',[0 0 0 ]' ,'a',UX,'q',0);

[uLINK(1).vertex,uLINK(1).face] = MakeBox([0.1 0.3 0.5] ,[0.05 0.15 -0.05] ); % BODY

[uLINK(7).vertex,uLINK(7).face] = MakeBox([0.2 0.1 0.02] ,[0.05 0.05 0.05]); % Foot

[uLINK(13).vertex,uLINK(13).face] = MakeBox([0.2 0.1 0.02] ,[0.05 0.05 0.05]); % Foot

FindMother(1); % Find mother link from sister and child data

%%% Substitute the ID to the link name variables. For example, BODY=1.

for n=1:length(uLINK)

eval([uLINK(n).name,'=',num2str(n),';']);

end

uLINK(BODY).p = [0.0, 0.0, 0.65]';

uLINK(BODY).R = eye(3);

ForwardKinematics(1);

uLINK(BODY).v = [0 0 0]';

uLINK(BODY).w = [0 0 0]';

for n=1:length(uLINK)

uLINK(n).dq = 0; % joint speed [rad/s]

end