Matlab HW

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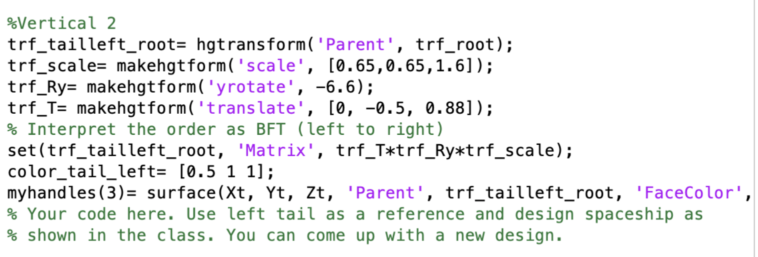
1 Spaceship Code

1.1 Complete the code

I have made my own version of the spaceship. The picture is given in the next page. To faciliate the understanding of the work, I will explain a section of the code given below. In this section of the code I am creating the vertical as comment in the code. The first line just transforms the object which is the tail to the root of the spaceship, hgtransform is used here. After this, I use the makehgtform to set the scale,translation and rotation of the object.The set function is then used to create the object and multiply all the transformations together into a matrix. The next line just sets the color.Finally the object is stored in the myhandles array. All of the elements are made in the makespachip file. Moving on, in the showhiereary file, everything is combined into one spaceship that is the trfship1root, the other spaceship is basically just a rotation of the first.



```
%Vertical 2
trf_tailleft_root= hgtransform('Parent', trf_root);
trf_scale= makehgtform('scale', [0.65,0.65,1.6]);
trf_Ry= makehgtform('yrotate', -6.6);
trf_T= makehgtform('translate', [0, -0.5, 0.88]);
% Interpret the order as BFT (left to right)
set(trf_tailleft_root, 'Matrix', trf_T*trf_Ry*trf_scale);
color_tail_left= [0.5 1 1];
myhandles(3)= surface(Xt, Yt, Zt, 'Parent', trf_tailleft_root, 'FaceColor',
% Your code here. Use left tail as a reference and design spaceship as
% shown in the class. You can come up with a new design.
```

Figure 1: Vertical Section code of the spaceship

1.2 Change the color

I have basically colored the entire spaceship with different colors. AS you can see I have a orangish color for the base, blue color for the boosters. etc.

1.3 Add a new Structure

I have added 2 new base structures, the pink and green color bases underneath the surface of the spaceship along with the boosters.

1.4 Make the spaceship move

In theMatlab file , at the end of the showhierarchy file I have added a for loop which runs from i=0; to i40 In this for loop the space ship is moving in nice trajectory , because it is moving i units into one direction , i/2 in another and i/3 in another so for every i, the position of the spaceship is different and thus follows a ”nice” path.

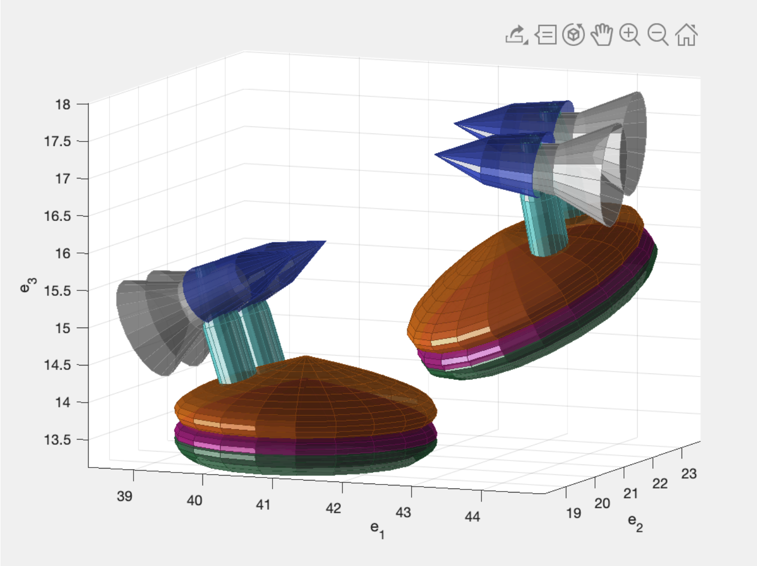
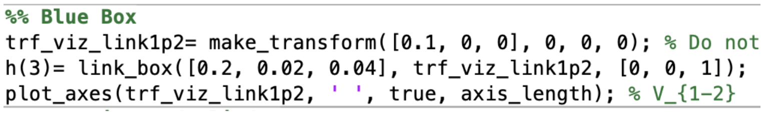


Figure 2: Spaceship

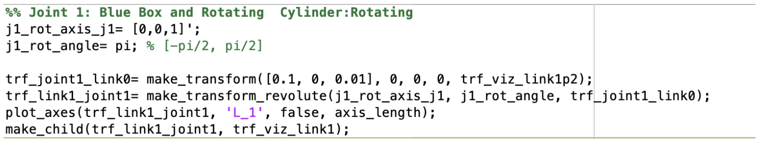
2 Robot Teddy

Here I created a robot.It looks a bit like teddy from Mr.Bean thus the name.To faciliate the understanding of the work, I will again explain a section of the code given below. Firstly, lets take a look at the construction of the elements. Let's take the light blue cylinder construction for example.The first two line are creating the cylinder with the specific size, tranformation rotation and color. The joint section of this however links the dark blue part with the cylinder by making it a child of the parent.This method is repeated for every single element. Here the first two lines are just creating the box with the specific parameter fro rotation, transformation ,color etc. The last line just plots the link on the graph.This is where the linking or joining of the parts happen, as you can see the part is linked with the cylinder by making it a child of it.



```
%% Blue Box
trf_viz_link1p2= make_transform([0.1, 0, 0], 0, 0, 0); % Do not
h(3)= link_box([0.2, 0.02, 0.04], trf_viz_link1p2, [0, 0, 1]);
plot_axes(trf_viz_link1p2, ' ', true, axis_length); % V_{1-2}
```

Figure 3: Creation of the object: Blue part



```
%% Joint 1: Blue Box and Rotating  Cylinder:Rotating
j1_rot_axis_j1= [0,0,1]';
j1_rot_angle= pi; % [-pi/2, pi/2]

trf_joint1_link0= make_transform([0.1, 0, 0.01], 0, 0, 0, trf_viz_link1p2);
trf_link1_joint1= make_transform_revolute(j1_rot_axis_j1, j1_rot_angle, trf_joint1_link0);
plot_axes(trf_link1_joint1, 'L_1', false, axis_length);
make_child(trf_link1_joint1, trf_viz_link1);
```

Figure 4: Linking of the blue part with the rotating cylinder

Below is the picture of the robot

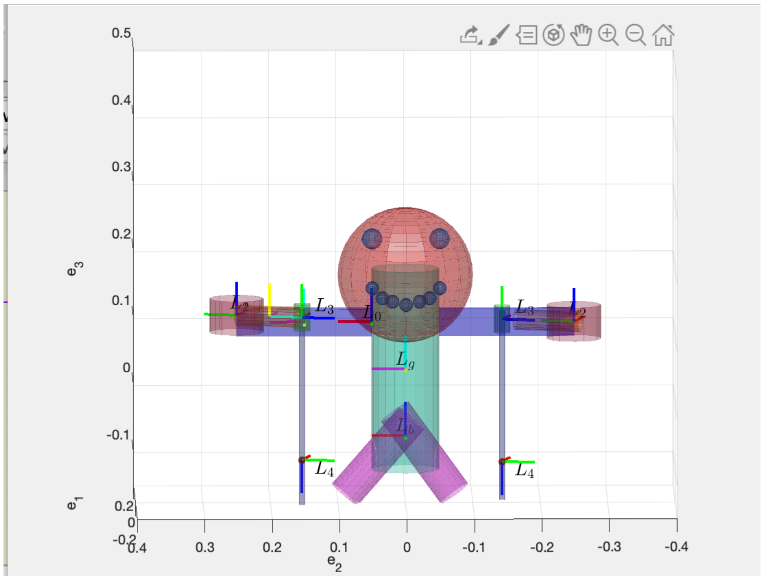


Figure 5: Picture of robot