makeSpaceShip

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This folder contains three files:

- make_spaceship.m
- show_object_hierarchy.m
- spaceShip.pdf (this file)

I referred to the code provided in order to change the shape/structure of my spaceship and move it in a trajectory. Running the script “show_object_hierarchy.m” runs the code with the movement.

I created my new structure called “sphere” referring the guidelines/code provided that created the other structures (like top dish, bottom dish, etc.). The sphere structure is the space for the pilot to sit. A screenshot of the code used to make the sphere is below:

```
%ADDING A NEW STRUCTURE -> SPHERE
[Xs, Ys, Zs] = sphere;
r = 1;
xx = Xs * r;
yy = Ys * r;
zz = Zs * r;

% Sphere
trf_sphere= hgtransform('Parent', trf_root);
set(trf_sphere, 'Matrix', makehgtform('translate', [0, 0, 1]));
color_sphere= [0.9, 0.1, 0.6];
myhandles(7)= surface(xx, yy, zz, 'Parent', trf_sphere, 'FaceColor', color_sphere, 'FaceAlpha', transparency, 'EdgeColor',
```

I modified the tail of the spaceship and added it to both the right and left sides. I have three (including left and right) more variations of the cylinder structure on the tail end in order to design my spaceship according to my liking. I have changed the dimension, scaling and transformed the cylinder structure. A screenshot of my code is below:

```
% Creates x, y, z coordinates of unit cylinder to design the space ship (right side)
[Xr, Yr, Zr]= cylinder([0.175, 0.2, 0.4]);
trf_tailright_root= hgtransform('Parent', trf_root);
trf_scale= makehgtform('scale', [1,1,2.75]);
trf_Ry= makehgtform('yrotate', -pi/2);
trf_T=makehgtform('translate', [-1.5, -0.75, 0.5]);
set(trf_tailright_root, 'Matrix', trf_T*trf_Ry*trf_scale);
color_tail_right= [0.9 0.2 0.5];
myhandles(4)= surface(Xr, Yr, Zr, 'Parent', trf_tailright_root, 'FaceColor', color_tail_right, 'FaceAlpha', transparency, '

% Creates x, y, z coordinates of unit cylinder to design the space ship on (left side)
```

In order to make the spaceship move in a trajectory, I have used a for loop in my show_object_hierarchy file. I transform the spaceships using the transformation matrices t1 and t1 until the for loop is completed. Every iteration of the for loop transforms the spaceship with the given matrix. All the iterations of the for loop results in the spaceship appearing to move in a trajectory.

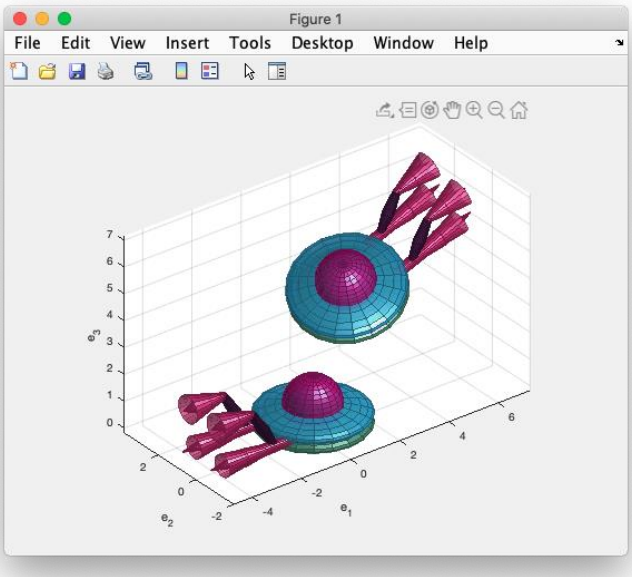
```
% TO MAKE THE SPACESHIP MOVE IN A NICE TRAJECTORY

for t = linspace(0,30,30)
    t1 = [t, 1+t, t-1];
    t2 = [t, t-1, 1-t];
    x = makehgtform('translate', t1);
    y = makehgtform('translate', t2);
    ref1 = x * trf_roll;
    ref2 = y * trf_pitch;
    set(trf_ship1_root, 'Matrix', ref1);
    set(trf_ship2_ship1, 'Matrix', ref2);
    pause(0.075)
end
```

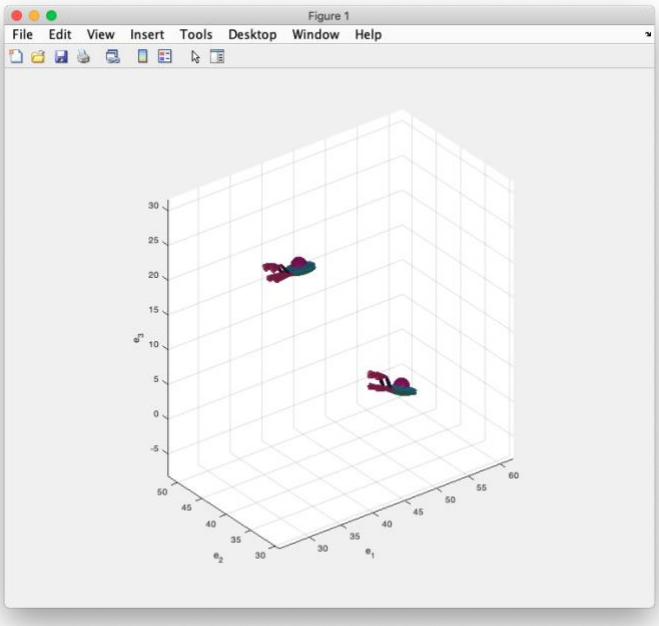
Therefore, I have also done the following (bonus/extra points):

1. Changed the color of some parts of the spaceship.
2. Added a new structure (sphere)
3. Made the spaceship move in a trajectory.

Pictures of mySpaceShip:



mySpaceShip



mySpaceShip after movement