```
%==========================================================================
%GENERATES THE DATASET OF OBJECTS
%==========================================================================

max_num_points = 100; %the maximum number of points per cluster
num_clusters = 10; %the number of clusters

X = [];
Y = [];
Z = [];

spread = .5;

base = 15; %range of values within which the origin of a cluster is generated

for i = 1 : num_clusters

num_points = randperm(max_num_points,1); %randomizes the sizes of the clusters

origin = -base + 2*base*rand(1,3); %generates a random origin

position_matrix = origin + (2*spread*rand(num_points,3) - spread); %generates a
random matrix of points from (origin - spread) to (origin + spread)

X = [X; position_matrix(:,1)];
Y = [Y; position_matrix(:,2)];
Z = [Z; position_matrix(:,3)];

endfor

position_matrix = [X Y Z];

figure, scatter3(X,Y,Z)

%==========================================================================
%CLUSTERS OBJECTS
%==========================================================================

N = 3;

[final_object_matrix final_delta] = optimize_cluster_objects3D(position_matrix,N);

%==========================================================================
%COLORS AND DISPLAYS OBJECTS IDENTIFIED
%==========================================================================

num_objects = max(final_object_matrix)
```

```
for i = 1 : num_objects

x = find(final_object_matrix == i);

C(x,1) = rand();
C(x,2) = rand();
C(x,3) = rand();

endfor

S = 10*ones(1,size(position_matrix,1));

figure, scatter3(X,Y,Z,S,C)
```