Problem 1.3 - Simulate Lorentz System

```matlab
y0_1 = [0 2 0];
y0_2 = [0 -2 0];
y0_3 = [0 2.01 0];

tspan = [0 40];

[t,y1] = ode45(@lorentz,tspan,y0_1);
[t,y2] = ode45(@lorentz,tspan,y0_2);
[t,y3] = ode45(@lorentz,tspan,y0_3);


clf;
subplot(3,1,1)
plot3(y1(:,1), y1(:,2), y1(:,3))
subplot(3,1,2)
plot3(y2(:,1), y2(:,2), y2(:,3))
subplot(3,1,3)
plot3(y3(:,1), y3(:,2), y3(:,3))

% ODE function
function [yout] = lorentz(t, yin)
  sigma = 10;
  b = 8/3;
  r = 28;

  x = yin(1);
  y = yin(2);
  z = yin(3);
  xdot = sigma*(y - x);
  ydot = r*x - y - x*z;
  zdot = x*y - b*z;

  yout = [xdot; ydot; zdot];

end
```
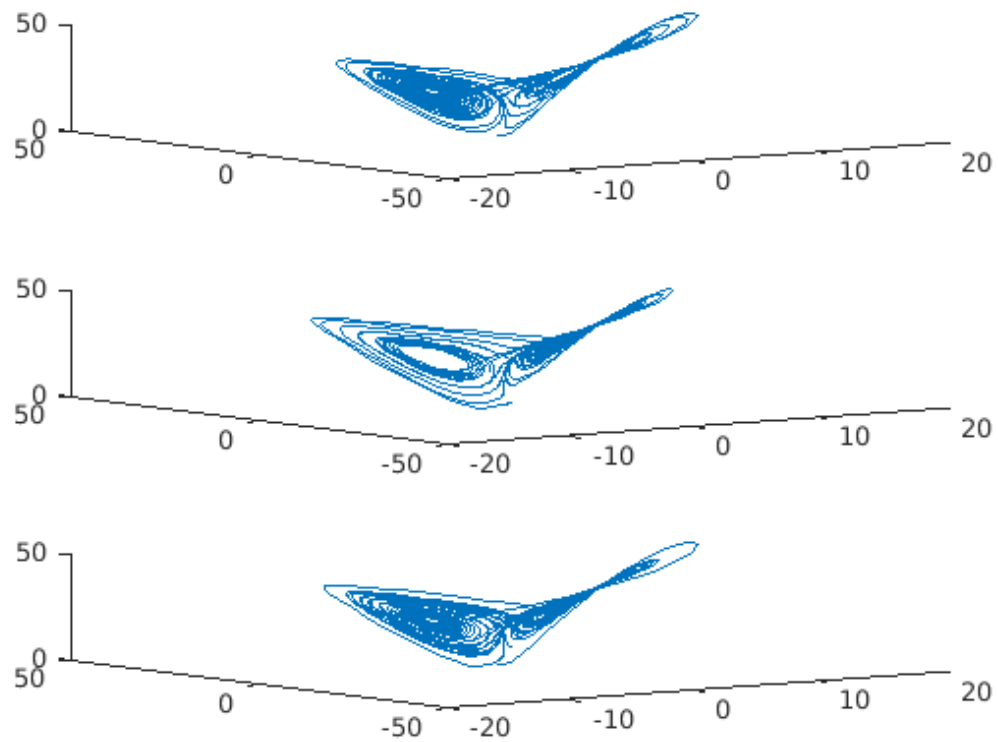
Observations

While the general behavior of the system doesn't change with the initial conditions, the direction of the orbits and the density about each center can change with small changes in the initial conditions

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