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% iterated version of Lorenz attractor in Matlab
clear %clears all variables
sigma=10; %set parameters for attractor
beta=8/3;
rho=28;

x=rand*20-10; %start with random x, y, z values
y=rand*20-10;
z=rand*20-10;

for t=1:5000, %For loop runs 5000 times
    newx=x+.01*(sigma*(y-x)); %update based on ODEs
    newy=y+.01*(x*(rho-z)-y); %01 makes each update small
    newz=z+.01*(x*y-beta*z);
    x=newx; %save new values as x, y, z
    y=newy; %for next cycle through this For loop
    z=newz;
    allx(t)=x; %store x, y, z in the element of each vector
    ally(t)=y;
    allz(t)=z;
end

plot3(allx, ally, allz) %plot the 3D Lorenz attractor

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