**2c**

X = 0.13:0.005:3.5;

Z = 1./ (1 + (X./1.5).^2.7);

N = (Z./0.4).^2.7;

S = (X+X.\*N-1.5)./(5-X);

plot(S,X,'b');

xlabel('Signal S')

ylabel('Expression of X')

title('steady-state values of toggle switch','FontSize',12)



**2d**

global S ax bx zx nzx ay by xy nxy xz nxz yz nyz deltay deltaz

S = 10^5;

tspan = [0 50];

y0 = [0;0;0];

ax = 0.039;

ay = 0.0043;

bx = 6.1;

by = 5.7;

deltay = 1.05;

deltaz = 1.04;

zx = 0.000013;

yz = 0.011;

xz = 0.12;

xy = 0.00079;

nzx = 2.32;

nxy = 2;

nxz = 2;

nyz = 2;

[t,y] = ode45(@acdc,tspan,y0,[],S,ax,bx,zx,nzx,ay,by,xy,nxy,xz,nxz,yz,nyz,deltay,deltaz);

plot(t,y(:,1),'b');

xlabel('dimensionless time t')

ylabel('dimensionless expression of X')

title('X vs. time when S=10^5','FontSize',12)

