function sd\_prime = fsd\_prime(time, p)

%Reaction constants

k1 = 1;

k2 = 1;

k3 = 1;

s\_t = 1; %production rate constant of TEV

d\_t = 1; %degradation rate constant of TEV

s\_sd = 1; %production rate constant of splitDioxygenase

d\_sd = 1; %degradation rate constant od splitDioxygenase

d\_tsd = 1; %degradation rate constant of TEV-splitDioxygenase

d\_d = 1; %degradation rate constant of Dioxygenase

sd\_prime = zeros(4,1);

%p(1) = [T] = [TEV]

%p(2) = [sD] = [splitDioxygenase]

%p(3) = [T-sD] = [TEV-splitDioxygenase]

%p(4) = [D] = [Dioxygenase]

%Production rate of TEV

sd\_prime(1) = -k1\*p(1)\*p(2) + (k2+k3)\*p(3) + s\_t - d\_t\*p(1);

%Production rate of sD

sd\_prime(2) = -k1\*p(1)\*p(2) + k2\*p(3)+ s\_sd - d\_sd\*p(2);

%Production rate of T-sD

sd\_prime(3) = k1\*p(1)\*p(2) - (k2+k3)\*p(3) - d\_tsd\*p(3);

%Production rate of D

sd\_prime(4) = k3\*p(3) - d\_d\*p(4);

end

ODE-Solver:

time = 0:0.1:20;

[time,p] = ode45(@fsd\_prime,time, [0 1 0 0]);

figure

subplot(2,2,1), plot(time,p(:,1))

title('Production of TEV')

xlabel('time [s]')

ylabel('concentration')

subplot(2,2,2), plot(time,p(:,2))

title('Production of splitDioxygenase')

xlabel('time [s]')

ylabel('concentration')

subplot(2,2,3), plot(time,p(:,3))

title('Production of TEV-splitDioxygenase')

xlabel('time [s]')

ylabel('concentration')

subplot(2,2,4), plot(time,p(:,4))

title('Production of Dioxygenase')

xlabel('time [s]')

ylabel('concentration')