**Exercises: Point kinetics**  
1. Use the m-file pointk.m and ode45 to simulate the response for 60 seconds when the excess reactivity is 80 pcm.

Hints:  
 a) Set al=log(2)/8;beta=0.00600;L=1.6825e-5;  
 b) Define the initial condition y0=[1;beta./al/L]  
 c) Use ode15s :  
 >> [t,y]=ode15s(@pointk,[0 60],y0);

2. Note that the system is linear if raa is constant. Define the A-matrix for raa=80 pcm and calculate the  
 eigenvalues. Use the positive eigenvalue to evaluate the doubling time.

Hint: 

3. In the same plot as you have plotted y(:,1), plot the response corresponding to the positive eigenvalue (y=y0\*exp(t\*p), where p is the positive eigenvalue).

a ) Why are the curves different?

1. Include the impact of the prompt jump, find a good value from the plot and plot again with the new that takes into account the impact of the prompt jump.

4. Use the function dub2raa to plot the doubling time as a function of reactivity for τ2=10 to τ2=100 s.

5. Use the function inv\_kinetics to calculate the reactivity and the precursors from n

a) For the simulated signal in exercise 1 and with default values in inv\_kinetics:   
[t,y]=ode15s(@pointk,[0 60],[1;beta/L/al]);  
[t1,rho,conc]=inv\_kinetics(t,y(:,1));  
plot(t1,rho)

b) For the simulated signal in exercise 1 with the actual values:   
[t1,rho1,conc1]=inv\_kinetics(t,y(:,1),beta,al);  
plot(t1,rho1)

c) Compare conc1 with y(:,2).   
 plot(t1,conc1)  
 hold on  
 plot(t,y(:,2))