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) Copy and paste al and b from the file pointk.m to command line so al and b are defined

b) Define the initial condition y0=[1;b./al/L]

c) Use ode45 :

```
>> [t,y]=ode45(@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.

3. Use the options to get rid of the shaggy look.

4. Pass in al and beta as input arguments to pointk. Run with beta = 500pcm

5. Write a function fcn_raa that specifies the reactivity and pass in as a function handle to pointk

6. Use the function dub2raa to plot the reactivity vs doubling time for τ_2=10 to τ_2=1000 s.

7. Use the function dub2raa and fzero to create the inverse function raa2dub: t2=raa2dub(raa) use $\tau_2=5000/\rho$ to get a starting guess.