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%{
Written by Tianyu Gao
Born on Sept 16, 2015
%}
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$$\frac{dVC_A}{dt} = vC_{A,0} - vC_A - k_1C_AV$$

$$\frac{dVC_B}{dt} = vC_{B,0} - vC_B + k_1C_AV - k_2C_BV + k_3C_DV - k_4C_BV$$

$$\frac{dVC_C}{dt} = vC_{C,0} - vC_C + k_4C_BV$$

$$\frac{dVC_D}{dt} = vC_{D,0} - vC_D + k_2C_BV - k_3C_DV$$

Steady State and $\tau = \frac{V}{v}$

$$C_{A,0} = C_A + k_1C_A\tau$$

$$C_{B,0} = C_B - k_1C_A\tau + k_2C_B\tau - k_3C_D\tau + k_4C_B\tau$$

$$C_{C,0} = C_C - k_4C_B\tau$$

$$C_{D,0} = C_D - k_2C_B\tau + k_3C_D\tau$$

```
clc
clear all
close all

k = [0.1, 0.2, 0.1, 0.8]; % /sec
t = 10/1; % sec
Ci = [5; 0; 0; 1]; %feed
A = [1+k(1)*t, 0, 0, 0; -k(1)*t, 1+k(2)*t+k(4)*t, 0, -k(3)*t; 0, -
k(4)*t, 1, 0; 0, -k(2)*t, 0, 1+k(3)*t,];

[L, U, P]=lu(A); % P is permutation matrix, which L * U = P * A
disp('Solution is')
Css = U\ (L\ (P*Ci))
disp('Triangular matrix mutiple the feed vector is')
U*Css

Solution is

Css =

    2.5000
    0.3000
    2.4000
```

0.8000

Triangular matrix mutiple the feed vector is

ans =

5.0000

2.5000

1.8182

1.4545

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