Matlab program for CSTR simulation

Ordinary differential equation (ODE) setup

*** ODE for A**

$$\frac{dC_{A1}}{dt} = \frac{F}{V}(C_{A0} - C_{A1}) - kC_{A1}$$

***** ODE for B

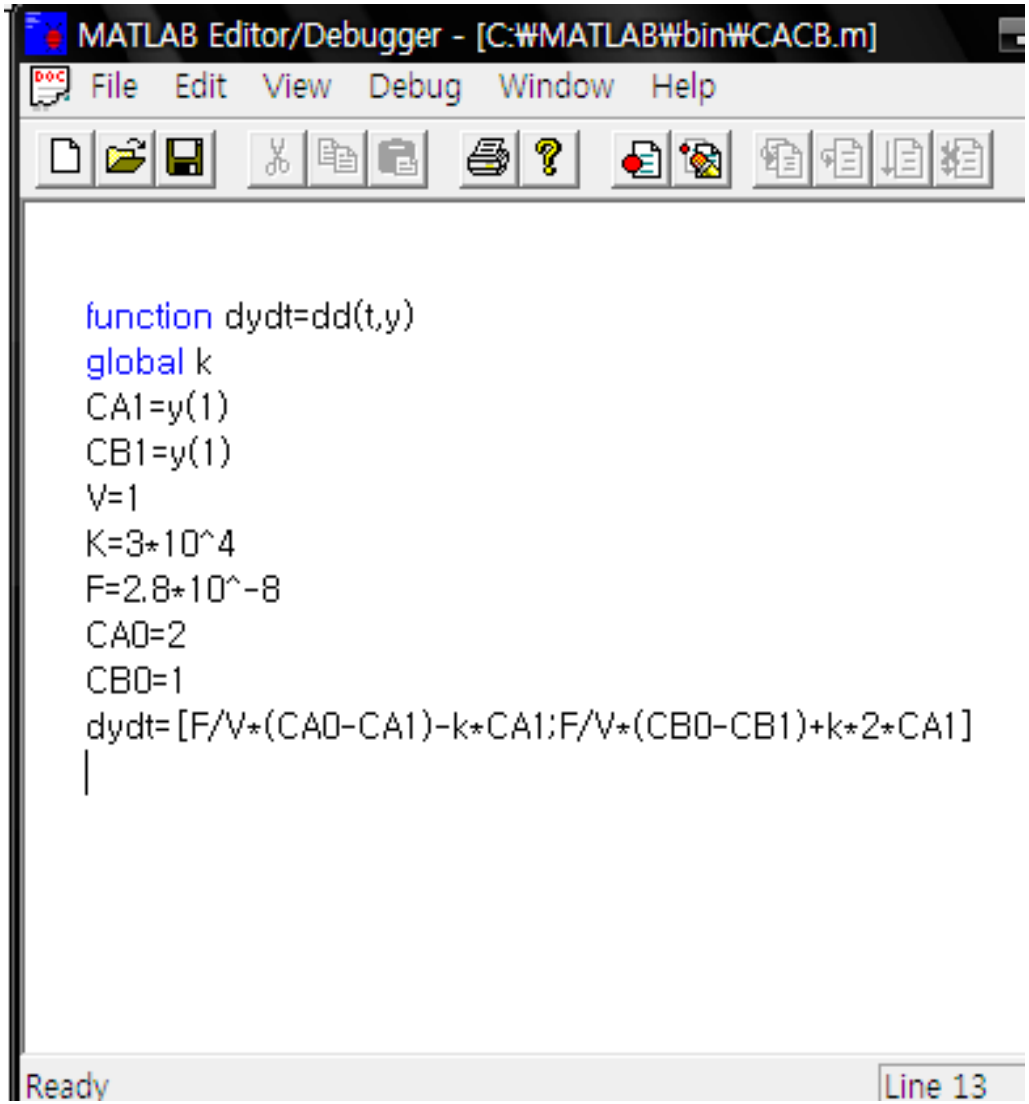
$$\frac{dC_{B1}}{dt} = \frac{F}{V}(C_{B0} - C_{B1}) + 2kC_{A1}$$

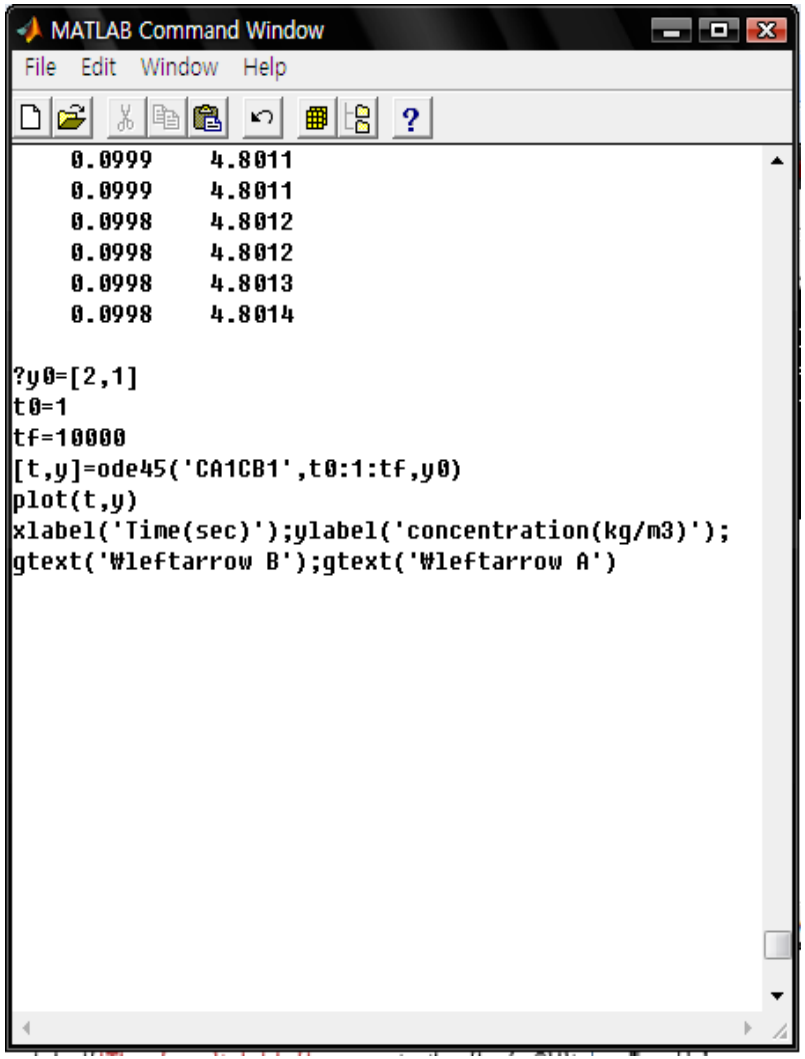
* Initial conditions

$V = 1L = 10^3 m^3$, $F = 2kg/m^3$, $k=3x10^{-4}/s$

$C_{A0} = 2kg/m^3$, $C_{B0} = 1kg/m^3$

- MATLAB programming




MATLAB Command Window
File Edit Window Help
0.0999 4.8011
0.0999 4.8011
0.0998 4.8012
0.0998 4.8012
0.0998 4.8013
0.0998 4.8014
?y0=[2,1]
t0=1
tf=10000
[t,y]=ode45('CA1CB1',t0:1:tf,y0)
plot(t,y)
xlabel('Time(sec)');ylabel('concentration(kg/m3)');
gtext('₩leftarrow B');gtext('₩leftarrow A')

- Simulation result