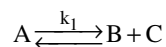
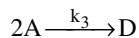


Puzzle Problem

Web P8-19_B What five things are wrong with this solution?

The *van de Vusse* reactions



take place in the gas phase and all follow elementary rate laws. Pure A enters a 100-dm³ PFR at a volumetric flow rate of 10 dm³/min at a concentration of 3 mol/m³.

$$k_1 = 0.05 \text{ min}^{-1}$$

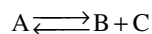
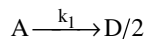
$$k_3 = 0.015 \text{ (dm}^3\text{/mol)/min}$$

$$K_C = 0.5 \text{ dm}^3\text{/mol}$$

Plot C_A , C_B , C_C , and C_D as a function of V .

Solution

Taking A as the basis of calculation for both reactions



The equations for the Polymath solutions are shown below.

Calculated values of DEQ variables

Variable	Initial value	Minimal value	Maximal value	Final value
1 Ca	3.	0.4541998	4.381897	0.4541998
2 Cb	0	0	2.809564	1.340173
3 Cc	0	0	2.809564	1.340173
4 Cd	0	0	3.885973	3.885973
5 V	0	0	100.	100.

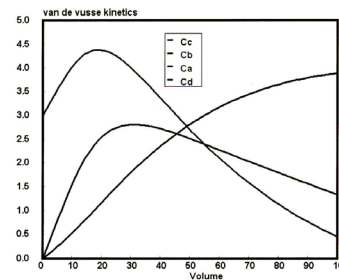
Differential equations

1 $d(Cc)/d(V) = .05*(Ca-Cb*Cc/2)$

2 $d(Cb)/d(V) = 0.05*(Ca-Cb*Cc/2)$

3 $d(Ca)/d(V) = 0.05*(Ca-Cb*Cc/2) -.015*Ca$

4 $d(Cd)/d(V) = 0.015*Ca$



- 1) Line ___ reads _____, should read _____
 - 2) Line ___ reads _____, should read _____
 - 3) Line ___ reads _____, should read _____
- etc.