Scheme-4 Reactor-1

Part-2, Case-2

ta = 450 sec, tm = 1200 sec
k1 = 0.1, k2 = 0.01

NBt/NAt = 1.56248

Exponent a = 0.5
Exponent b = 1.5
Exponent c = 0.5
Exponent d = 1.5

WA = 200
WB = 78.1239
NBt = 4.16661
Vt = 2.13906
Vat = 1.03906
Tot.Solv. = 2
SolA/(SolR+SolA) = 0.5

NA0 = 2.66667
NB0 = 0

Total input = 278.124 kg
Total output = 278.125 kg

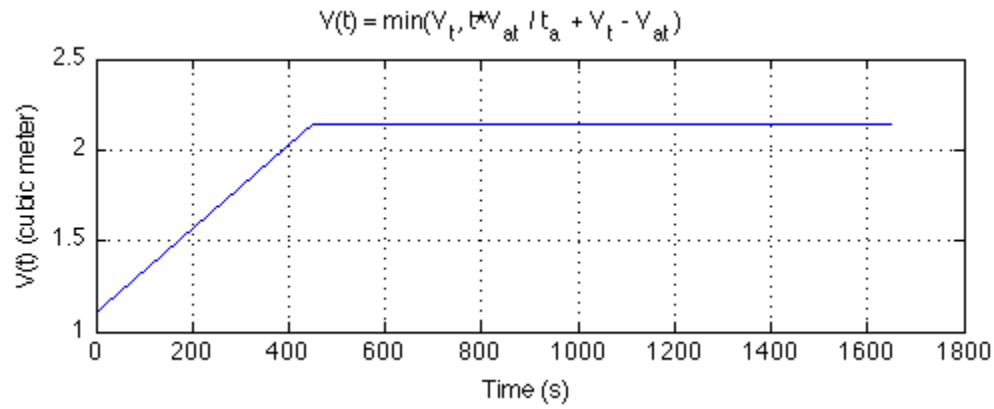
Chemical Balance Error = 0.00154243 kg (% 5.54584e-06)

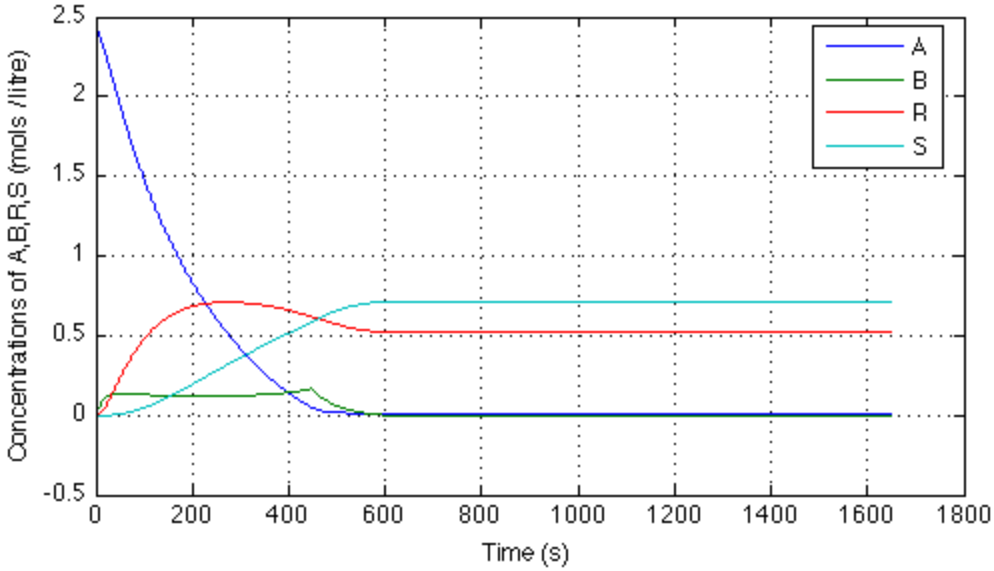
Solver: Explicit Runge-Kutta (4,5) Variable step (Dormand-Prince Pair)
Error tolerance: 0.1%

Final Concentrations with Step Size limited to 0.001
NA (final) = 0.0266637
NB (final) = -2.83584e-12
NR (final) = 1.11339
NS (final) = 1.52661

Final Concentrations with Step Size limited to 0.01
NA (final) = 0.0266616
NB (final) = 2.83611e-10
NR (final) = 1.11339
NS (final) = 1.52661

Time when NB (final) < 0: 619.03s


V(t) = min(V_t, t*V_at / t_a + V_t - V_at)
V(t) (cubic meter)
Time (s)
2.5
2
1.5
1
0
200
400
600
800
1000
1200
1400
1600
1800


Concentrations of A,B,R,S (mols / litre)
Time (s)
A
B
R
S
2.5
2
1.5
1
0.5
0
-0.5
0
200
400
600
800
1000
1200
1400
1600
1800