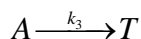
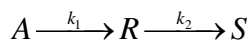


CHG 3127
Assignment #5
(Due date: April 15/2011)

Problem1

For the elementary reactions



(a) Show for PFR that

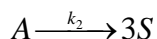
$$\frac{C_{R,\max}}{C_{A0}} = \frac{k_1}{k_1 + k_3} \left(\frac{k_2}{k_1 + k_3} \right)^{\frac{k_2}{(k_1 - k_2 + k_3)}} \quad \text{at} \quad \tau_{opt} = \frac{\ln \left[\frac{(k_1 + k_3)}{k_2} \right]}{(k_1 - k_2 + k_3)}$$

(b) Show for CSTR that

$$\frac{C_{R,\max}}{C_{A0}} = \frac{k}{\left(\sqrt{k_1 + k_3} + \sqrt{k_2} \right)^2} \quad \text{at} \quad \tau_{opt} = \frac{1}{\sqrt{k_2} (k_1 + k_3)}$$

Problem2

The elementary liquid-phase reactions



are to be carried out in a plug flow reactor. At the steady state with pure feed and the space time of 15 sec in the reactor, the conversion and molar ratio of R to S are 0.70 and

$\frac{3}{10}$ respectively, Find rate constants k_1, k_2