A First Course on Kinetics and Reaction Engineering
Practice Problem 8.3

Problem Purpose

This problem will help you determine whether you have mastered the learning objectives for this unit.

Problem Statement

Suppose that the macroscopically observed reaction (1) actually occurs according to the mechanism given in reactions (2) through (5). Derive a rate expression for reaction (1) assuming step (5) to be rate-determining.

$$A + B \rightarrow Y + 3Z \tag{1}$$

$$A + B \rightleftarrows I + J \tag{2}$$

$$I + B \rightleftarrows K + J \tag{3}$$

$$K + B \rightleftarrows Y + 2Z \tag{4}$$

$$2J \rightleftarrows 2B + Z \tag{5}$$