A First Course on Kinetics and Reaction Engineering
Problem 2.2

Problem Purpose

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

Problem Statement

Suppose that the feed to an adiabatic water-gas shift reactor consists of 40% steam, 10% CO, 5% CO_2, 35% H_2 and 10% N_2 at a temperature of 340 °C and a pressure of 25 atm. (See Practice Problem 2.1 for information about the water-gas shift reaction.) Generate an expression for the outlet temperature as a function of the fractional conversion of CO. (You can find the necessary thermodynamic data in "The Properties of Gases and Liquids," 3rd ed. by Reid, Prausnitz and Sherwood. McGraw-Hill, New York, 1977, among other sources.)