

A First Course on Kinetics and Reaction Engineering

Practice Problem 11.4

Problem Purpose

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

Problem Statement

Suppose you have an 18 gal stirred tank in your lab that you want to use to perform kinetics experiments. You establish a steady flow of water through the reactor at a rate of 5 gal min^{-1} . You then start a timer, as you start continuously adding dye to the inlet at a concentration of 2 oz gal^{-1} . The resulting concentration of tracer in the outlet as a function of time is recorded in the table below. On the basis of the age function of the stirred tank, do you believe it can be modeled as an ideal CSTR?

Time (min)	Concentration (oz/gal)
0	0.00
1	0.24
1.5	0.53
2	0.77
2.5	0.98
3	1.04
4	1.34
5	1.47
6	1.58
7	1.62
8	1.67
9	1.89
10	1.93
12	1.97
14	1.86
16	2.06
18	2.02
20	1.92