Laboratory and Homework Assignment 5

Reading Assignment

1. "Chapter 10: Binary Continuous Distillation Column" from Jana, Amiya K. Chemical process modelling and computer simulation. PHI Learning Pvt. Ltd. 2011.
2. "Chapter 9: Distillation" from Treybal, Robert E. Mass-Transfer Operations. McGraw-Hill Book Company (Third Edition).

Laboratory Assignment (Due after laboratory session)

1. [30 points] Consider the separation of a saturated liquid mixture of acetone (the light component) and propyl acetate, containing 45 mol% acetone. The distillate should contain 96 mol% acetone, and the bottoms should contain 4 mol% acetone. Assume that constant molar overflow applies and the equilibrium diagram can be represented with a constant value of $\alpha = 4.64$. Use the graphical McCabe-Thiele method in **matlab** to find:
   (a) The minimum number of equilibrium stages required to achieve the separation.
   (b) The minimum reflux and reboil ratios.
   (c) The actual number of equilibrium stages required to achieve the separation at a reflux ratio of $1.5r_{\text{min}}$.
2. [20 points] Check your estimates by doing rigorous simulation in ASPEN.