



## **In-Class Exercises n° 04**

### **(Distillation – Binary distillation: Ponchon–Savarit method)**

**Exercise:**

1000 kg/h of a mixture containing 42 mol% heptane and 58 mol% ethyl benzene is to be fractionated to : a distillate containing 97 mol% heptane and a residue containing 99 mol% ethyl benzene using a total condenser and feed at its saturated liquid condition. The enthalpy-concentration data for the heptane-ethyl benzene at 1 atm pressure are as follows:

$x_{\text{heptane}}$	0	0,08	0,18	0,25	0,49	0,65	0,79	0,91	1,0
$y_{\text{heptane}}$	0	0,28	0,43	0,51	0,73	0,83	0,90	0,96	1,0
$H_L(\text{kJ/kmol})\times 10^{-3}$	24,3	24,1	23,2	22,8	22,05	21,75	21,7	21,6	21,4
$H_V(\text{kJ/kmol})\times 10^{-3}$	61,2	59,6	58,5	58,1	56,5	55,2	54,4	53,8	53,3

Calculate the following:

- a. Number of stages at **R = 2.5**;
- b. Condenser duty;
- c. Reboiler duty.