Modelling and Control of Binary Distillation Column

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Abstract : Distillation is a very old separation technology for separating liquid mixtures that can be traced back to the chemists in Alexandria in the first century A. D. Today distillation is the most important industrial separation technology. By the eleventh century, distillation was being used in Italy to produce alcoholic beverages. At that time, distillation was probably a batch process based on the use of just a single stage, the boiler. The word distillation is derived from the Latin word destillare, which means dripping or trickling down. By at least the sixteenth century, it was known that the extent of separation could be improved by providing multiple vapor-liquid contacts (stages) in a so called Rectifactorium. The term rectification is derived from the Latin words rectefacere, meaning to improve. Modern distillation derives its ability to produce almost pure products from the use of multi-stage contacting. Throughout the twentieth century, multistage distillation was by far the most widely used industrial method for separating liquid mixtures of chemical components.The basic principle behind this technique relies on the different boiling temperatures for the various components of the mixture, allowing the separation between the vapor from the most volatile component and the liquid of other(s) component(s). •Developed a simple non-linear model of a binary distillation column using Skogestad equations in Simulink. •We have computed the steady-state operating point around which to base our analysis and controller design. However, the model contains two integrators because the condenser and reboiler levels are not controlled. One particular way of stabilizing the column is the LV-configuration where we use D to control M_D, and B to control M_B; such a model is given in cola_lv.m where we have used two P-controllers with gains equal to 10.

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