Energy-efficient distillation columns design for an existing sequence using driving force approach

ABSTRACT

In this paper, the driving force approach is used to identify energy-efficient distillation columns design of an individual distillation column in the existing sequence. The driving force curves of all binary splits of a multicomponent are constructed, where each curve is representing an individual column. Then several points located at those curves are selected representing the column design candidates. Three different points (points A, B, C) are selected, where point A is located at the maximum of the curve and points B and C are located slightly below the maximum point. Then, the existing individual distillation column is redesigned based on these points. Different values of reflux ratio and feed location are calculated based on each selected points and then to be used to simulate distillation column using rigorous simulation approach. Once simulation for all design points have been conducted, then all energy requirements of reboilers and condensers for all distillation columns are obtained and analysed. The energy requirements from all sequence designs are compared with the existing sequence. From all the results obtained, distillation columns sequence designed at the maximum points of the driving force curves (57.13 MW) shows 3.68 % reduction compared to the existing sequence (59.31 MW).