Dynamic Modeling of the Fluid Catalytic Cracking Process for an Advanced Control Design

정다빈, 정태영[1], 장 홍[1], 이재형[1,*]
이화여자대학교; [1]KAIST
(jayhlee@kaist.ac.kr*)

Fluid Catalytic Cracking (FCC) has been widely used to convert high molecular weight hydrocarbons of the crude oil to low molecular weight hydrocarbons such as gasoline, middle distillate fuels. Under growing level of regulations on greenhouse gas emission, economic operation of the FCC process is one of the solutions for the problem. The reason is that the coke burn-off in the FCC accounts for a quarter of total greenhouse gas emission from petroleum refineries, which takes second largest part following combustion. Many studies have been carried out on simplified dynamic modeling of the FCC unit for basic control designs. However, there are a number of difficulties in modeling FCC unit because FCC process shows strong nonlinearity and complexity due to interactions among variables that are observed in industrial practice. The objective of this study is to construct more rigorous dynamic model which can fully consider the key features for using in high-level control designs such as an economic model predictive control.