

Multiperiod Planning Models for Production Plants Considering Constraints on Capacity, Purchase and Sales Contracts

박민환, 박선원*, Ignacio E. Grossmann¹
한국과학기술원; ¹Carnegie Mellon Univ.
(sunwon@kaist.ac.kr*)

We consider short and long term multiperiod production planning of a chemical process. The process involves NP processes, NC chemicals for which NI inventories are kept over NT time periods. The operation of process is constrained by existing capacities of each process, limits in the supplies of raw materials and market saturation of some products. The objective in the short term planning problem is to determine over a given time horizon, typically composed of weeks or months, the types of contracts for the purchase of raw materials and sales of products in order to maximize the NPV.

We consider various models for the supply/demand that involve different contract types which include various type of discounts depending on the volumes and lengths of contracts. We will assume that all the information is available in order to formulate the problem as a multiperiod MILP model. For the cases in which we do not have all the information to set up the model to optimize simultaneously the process because gathering the information might be expensive, we propose a sequential strategy for identifying the bottlenecks in the capacities, supplies or demands that might be potentially removed.