

AgentSDH



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Concepts



- Not greedy

- ◆ The contracts of selling over the inventory are refused.
- ◆ It don't buy the quantities that cannot be sold

Negotiation Strategy (Seller)

■ Weights of Linear Utility Function

◆ Quantity : Delivery time : Unit price = 3 : 0 : 2

■ Change the acceptable price based on the previous trades

$$p_{i,output}^{accept} = \begin{cases} p_{i-1,output}^{accept} * 0.95 & \text{if no signed sales contracts} \\ p_{i-1,output}^{accept} * 1.1 & \text{else if } p_{i,output}^{average} / p_{i-1,output}^{accept} > 1.1 \\ p_{i,output}^{average} * 0.9 & \text{otherwise} \end{cases}$$

i : current step

$p_{i,output}^{accept}$: acceptable unit price of output products

■ Target quantity is one-third of the number of lines in the factory

Risk Management in Seller's Contracts

- Signing contracts within the order of the unit price
- Refusing to sign the contract in the following cases:
 - ◆ Cannot keep the inventory needed to fulfill the contract by the delivery date
 - ◆ Not enough price to make a profit

$$p_{a,input} > p_{i,input}^{average} + p^{cost}$$

$p_{i,input}^{average}$: average unit price of input products in previously executed buy contracts

p^{cost} : cost of processing an input product into an output product

$p_{a,input}$: unit price of input product in contract 'a'

Negotiation Strategy (Buyer)

■ Weight of Linear Utility Function

◆ Quantity : Delivery time : Unit price = 1 : 0 : -2

■ Change of the acceptable price based on the previous trades

$$p_{i,input}^{accept} = \begin{cases} p_{i-1,input}^{accept} * 1.1 & \text{if no signed buy contracts} \\ p_{i-1,input}^{accept} * 1.05 & \text{else if } p_{i,input}^{average} / p_{i-1,input}^{accept} > 0.9 \\ p_{i-1,input}^{accept} * 0.95 & \text{otherwise} \end{cases}$$

i : current step

$p_{i,input}^{accept}$: acceptable unit price of input products

■ Target quantity to be one-third of the current inventory

Risk Management in Buyer's Contracts

- Signing the contracts within the order of the lowest unit price
- Signing the contract in the following cases :

- ◆ When the quantity does not exceed the average daily sales' quantity

$$\text{if } q_{a,output} \leq q_{i,output}^{average} - \text{inventory}[t] : p_{a,input} < p_{i,output}^{average} - p^{cost}$$

- ◆ If the average daily sales' quantity is exceeded

$$p_{a,input} < \max((p_{i,output}^{average} - p^{cost}) * 0.8, p_{i,input}^{average} * 0.8)$$

t : delivery date of the contract

$\text{inventory}[t]$: Inventory at step t

$p_{a,output}$: unit price of output product in contract 'a'

$q_{a,output}$: quantity of output product in contract 'a'

$q_{i,output}^{average}$: average number of sales per day in past contracts

$p_{i,output}^{average}$: average unit price of output products in previously executed sales contracts

$p_{i,input}^{average}$: average unit price of input products in previously executed buy contracts

How to Manage the Inventory

- A list whose length is the number of steps
 - ◆ List[N] : N-step output of the product inventory
- Buyer's contract
 - ◆ Adding to the inventory after the date it becomes available for sale
 - ◆ Calculating the processing dates based on the plant line usage
- Seller's contract
 - ◆ Keeping the output products produced at a time near the delivery date and reducing them from the inventory

Main Concepts in Collusion Track

- Same as Standard track except for the target quantity at the time of the selling contract.
- The target quantity at the time of the selling contract is as follows:

$$q^{target} = n_{lines}/3$$