LAB3: Computation of the EP2

Assessing the economic potential of level-2

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Lab

The economic potential of level-2 (EP_2) is defined as:

$$EP_2 = \dot{€}_{products} - \dot{€}_{raw\ materials}$$

with EP_2 in [M€/y].

If the EP_2 is greater than zero, the process may be economically attractive; vice versa, the process is not economically interesting.

EP_2 = (main products + by-products) – (raw materials) [M€/y]

$$EP_2 = \sum_{j=1}^{NP} €_{P,j} \cdot \dot{n}_j - \sum_{i=1}^{NR} €_{R,i} \cdot \dot{n}_i$$

$€_{P,j}$ = molar cost of the j-th product

$€_{R,i}$ = molar cost of the i-th reagent

$\dot{n}_j$ = molar flow of the j-th product

$\dot{n}_i$ = molar flow of the i-th reagent

NP = number of products

NR = number of reagents

Recycle streams

At this stage, only the input and output streams are considered (meanwhile, the recycles and all the material flows internal to the process are neglected).

Presence of by-products

By-products can be considered as:

- «Real» products (selling them at their market value);
- Process utilities (*e.g.*, burning them as fuel).

⇒ Find the most convenient alternative!

Degrees of freedom

The degrees of freedom affecting the EP_2 are the same as for material balances:

- Reactor temperature
- Split factor

⇒ Evaluate the EP_2 by varying the degrees of freedom within their validity range!

The input-output structure