$$I = P/V \quad or \quad P/S,$$

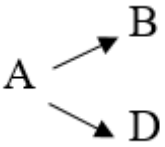
where P is productivity.

Expense ratio (β) is the amount of raw materials, water or energy (Q) spent on the production of a unit of mass or volume of the target product (m). For raw materials, β is expressed in t/t, nm^3/t, nm^3/nm^3; for energy, respectively, in $kW \cdot h/t$, $kW \cdot h/nm^3$.

$$\beta = Q/m.$$

Selectivity (σ) is the ratio of the mass of the target product to the total mass of the products obtained in the reaction. Selectivity characterizes the predominance of one of the directions of the process, if the transformation of raw materials leads to the formation of several final products.

So, if the process proceeds according to a parallel scheme:



where: *B* is *the target product*, *D* is a *by-product*, then the selectivity for products *B* and *D* will be respectively equal to:

$$\sigma_B = m_B/(m_B + m_D).$$

Since $m_B + m_D = m_{Ao} - m_A$,
then: $\sigma_B = m_B/(m_{Ao} - m_A)$.

The yield of the product, *the degree of conversion of raw materials* and *selectivity* are *technical* and *economic indicators characterizing the depth of the chemical process*. They are interconnected by the following system of equations, which were derived by appropriate substitutions:

a) for an irreversible process $A \rightarrow B$:

$$\eta_B = X_A,$$

b) for a simple reversible process $A \rightleftarrows B$:

$$\eta_B = X_A/X_A^*,$$

where X_A^* is the equilibrium degree of conversion of the initial reagent A,

c) for a parallel reaction, the relationship between η_B, X_A and σ_B is determined by the equation:

$$\eta_B = X_A \cdot \sigma_B.$$