

# COLLABORATIVE MULTI-AGENT MULTI-OBJECTIVE SYSTEM

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Today, most of the economic, technological and production processes cannot be developed in isolation, because their activity requires a close collaboration with other processes in various fields. This collaboration is carried out on the basis of Multi-Agent systems at the level of Artificial Intelligence models [1,2], which ensures: the sharing of resources and knowledge, common strategies and objectives, participatory decisions, efficient management of projects and tasks, participation and active involvement of members, etc. In these systems the collaboration process takes place on the basis of an evolutionary coalition made up of a lot of Agents  $A = \{a_i, i = \overline{1, N}\}$ , that meet common objectives  $\min/\max(f(X)), \forall X \in R^N$ , where  $X = \{x_i, i = \overline{1, N}\}$ .

The evolution of coalitions to form collaborative groups takes place on the basis of the model:

$$\begin{cases} a_i \in A_j^{\min} \mid \frac{\partial f(x_j)}{\partial x_i} < 0, i = \overline{1, N}, j = \overline{1, K}, i \neq j \\ a_i \in A_j^{\max} \mid \frac{\partial f(x_j)}{\partial x_i} > 0, i = \overline{1, N}, j = \overline{1, K}, i \neq j \end{cases} \quad (1)$$

Where:  $A_j^{\min}$  - is the crowd of Agents that form the coalition  $j$  and meet the objectives  $\min(f(X_j)), \forall X_j \in R^N$ ;  $A_j^{\max}$  - is the crowd of Agents that form the coalition  $j$  and meet the objectives  $\max(f(X_j)), \forall X_j \in R^N$ .

## References:

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