

# **INFLUENCE OF THE CULTURAL LEVEL IN THE EXTINCTION OF HOMO NEANDERTHALENSIS IN ITS COMPETITION WITH HOMO SAPIENS: ANALYSIS THROUGH THE GAME OF CONTESTS**

## **SUMMARY**

A study of the extinction of Homo neanderthalensis using the Tullock contest is presented. In this regard, a model is developed based on one of the possible causes of the extinction of Homo neanderthalensis: the arrival of Homo sapiens to Europe and the competition between them. The cultural level of the species is introduced in the contest as we consider this skill could have been a key factor since it could increase the contest effectiveness of the effort made in the Tullock contest. The dynamics chosen for the population is the replicator equation as it models the variation of the proportion of individuals of each species. This equation is now coupled with the temporal evolution of their cultural level.

The results show that, in the stationary state, coexistence is not possible, for a small change in Sapiens proportion or in their cultural level, yields the extinction of one of the species. The model also predicts the existence of a threshold in the initial concentration, which the Sapiens had to overcome to establish themselves and extinguish Neanderthals. We also show that reducing this threshold by increasing the cultural level with which the Sapiens break into the conflict is not very significant. When the contest has a cost, the ability to learn of Sapiens species and its relationship with the optimization of the effort could be decisive in the reduction of the threshold. Due to the creativity of Sapiens, both things seem to have happened.