

USING MONTE CARLO METHOD FOR SIMULATING OF POLITICAL SITUATION IN UKRAINE

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Introduction. The plurality of political parties is one of the features of democratically society. The way to the democracy in Ukraine began with creation of political parties of post-communistic directions, based mostly on social movements and organizations.

After the constitutional reform of 2004 till now, political parties got the status of the main subjects of the political process and took a central place in power. However, in the process of their creation and operation, society faced a bunch of problems: the political parties were more often created as electoral, personal or business projects, being increasingly under control of large financial-industrial groups, losing the ability to represent social interests. So, the political parties in Ukraine do not possess the appropriate public confidence and support [4].

The aim of this analysis is modeling the situation with distrust of society to the political parties with Monte Carlo method [1].

The tasks of this analysis are:

1. To make an analysis of literature about the problematical question.
2. To module the situation and to compare the results to the initial data.
3. To define how effective the Monte Carlo method can be.

The object of the analysis is the political situation and political distrust in Ukraine. The subject is the modeling of the political situation by Monte Carlo method.

The problem of the distrust of the society to political parties in Ukraine was studied by: M. Hylko (PhD) [6], O. Balakirjeva [2], O. Soskin [5], P. Burkovskij [3] and Razumkov Centre [4]. In their works the authors paid great attention to the reasons of such political problems as distrust to the parties. O. Balakirjeva and O. Soskin are focusing on the factors, influencing the development of party system in Ukraine and the reaction of society. In the analytical journal of Razumkov Centre "National security and defense" it is to find out the information and analysis of current state of the problem, based on different polls, researches and forecasting the situation. M. Hylko analyses

the cause-effect relationships between events and processes that affect evolution of the party system in Ukraine and the disbelief of the nation [6].

Also writers point out on the most major problems of Ukrainian parties:

- 1) lack of stable ties with certain social groups (stable social base);
- 2) weakness (lack of) program-ideological foundations;
- 3) regional support nature (absence of national parties);
- 4) breakaway from society;
- 5) tendency to establish blocks;
- 6) hypertrophied personal nature of the workers;
- 7) lack of internal party democracy.

I. Analysis of literature and sources on the issue of the problem.

Monte Carlo methods (or Monte Carlo experiments) are a class of computational algorithms that rely on repeated random sampling to compute their results. Monte Carlo methods are often used in simulating physical and mathematical systems. Because of their reliance on repeated computation of random or pseudo-random numbers, these methods are most suited to calculation by a computer and tend to be used when it is unfeasible or impossible to compute an exact result with a deterministic algorithm [1].

Monte Carlo simulation methods are especially useful in studying systems with a large number of coupled degrees of freedom, such as fluids, disordered materials, strongly coupled solids, and cellular structures (see cellular Potts model). More broadly, Monte Carlo methods are useful for modeling phenomena with significant uncertainty in inputs, such as the calculation of risk in business. These methods are also widely used in mathematics: a classic use is for the evaluation of definite integrals, particularly multidimensional integrals with complicated boundary conditions. It is a widely successful method in risk analysis when compared with alternative methods or human intuition. When Monte Carlo simulations have been applied in space exploration and oil exploration, actual observations of failures, cost overruns and schedule overruns are routinely better predicted by the simulations than by human intuition or alternative "soft" methods.

The term "Monte Carlo method" was coined in the 1940s by physicists working on nuclear weapon projects in the Los Alamos National Laboratory [6].

There is no single Monte Carlo method; instead, the term describes a large and widely-used class of approaches. However, these approaches tend to follow a particular pattern: define a domain of possible inputs; generate

inputs randomly from the domain using a certain specified probability distribution; perform a deterministic computation using the inputs; aggregate the results of the individual computations into the final result.

The research, modeling and analysis of this problem was based on the data of Rozumkov Centre – " Distrust to political parties, % "[4] (Fig. 1).

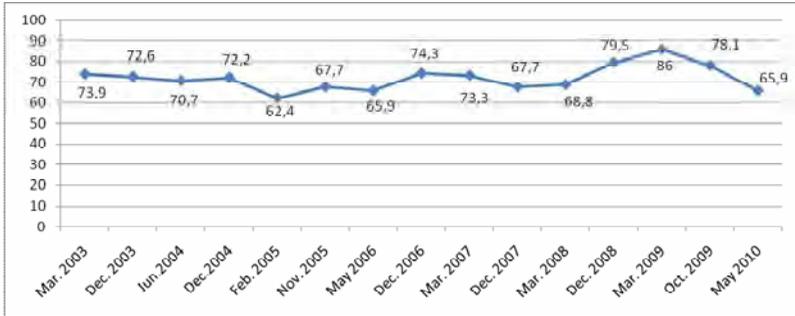


Fig. 1. The initial data of Rozumkov Centre named Distrust to political parties, %"

The data is based on social research and polls. For the most of questioned the key-reasons of distrust are lack of responsibility for performing its promises, election platforms (60%) and the fact that parties are not interested in everyday life of people, they are just fighting for power (54%). Similarly, the big part of questioned (56%) citizens believe that there are no such parties in Ukraine that report regularly to the electorate for the execution of parties and election programs [3].

II. The analysis of simulation results of the political distrust in Ukraine. Lets say that Y – the initial data of Rozumkov Centre [4], X – random figures, made by random figures generator. We will get a graph (Fig. 2).

In order to find out if the graphs and modules are compatible or not, we have to find the correlation and determination coefficients. As the formula of the correlation and determination coefficients is $R^2=0,88$ and $R=0,94 \approx 1,0$.

Because the coefficient of determination describes the extent to which variation of the dependent variable is determined by variation of the independent variable, then the closer to unity, the more confidently can state that the relationship between these variables is statistically significant. The closer R in its module to 1, the bigger is the connection. As we can see, the

coefficient R in this case is close to 1, we can say that this method is quite useful, and can be used in order to forecast the situation in future.

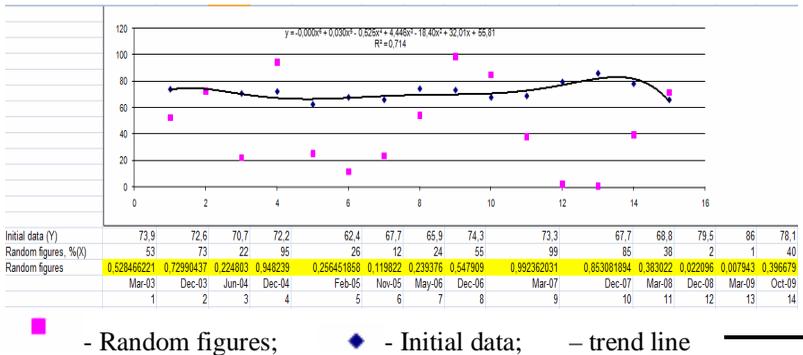


Fig. 2. Graph of initial and random data

III. Conclusions. Unfortunately, it is rather hard to forecast the situation with the Monte Carlo method of modeling, because the correlation coefficient is very big, and the figures are differing from each other a lot. Although on the graph (Fig. 2) we can see, that some figures coincide, the calculation shows another results.

According to the posed tasks we can make the below conclusions:

1. In the result of analyzed literature and the problematic question we can make the conclusion that it is reasonable to use presented method to such kinds of problems.

2. The initial data and the results that were gained, are very slightly different, which makes the solution of the problem by this method rather possible.

3. The Monte Carlo method can be used only with big or random numbers; the random figures generator changes the number too often, to get the most likely outcome.

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