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ФОРМЫ УЧАСТИЯ СУБЪЕКТА ФЕДЕРАЦИИ В РЕАЛИЗАЦИИ ГОСУДАРСТВЕННОЙ ПОЛИТИКИ ПО ОБЕСПЕЧЕНИЮ НАЦИОНАЛЬНОЙ БЕЗОПАСНОСТИ

FORMS OF PARTICIPATION OF THE FEDERATION SUBJECT IN THE IMPLEMENTATION OF STATE POLICY TO ENSURE NATIONAL SECURITY

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Аннотация. *Актуальность проблемы формализации политических процессов и систем и, как следствие, необходимость создания инструментальных средств, обеспечивающих научно-обоснованное принятие решений в управлении системами, поведение которых определяется слабо формализуемыми факторами и неопределенностью условий требует проведения исследований, направленных на приложение существующих моделей и методов исследования операций к проблемам политологии. В основе моделей политического поведения, представленных в статье, лежат элементы теории игр и идея оптимизации. Очевидно, что использование этих инструментальных средств моделирования социальных и политических процессов задача нетривиальная, решение которой позволит в гораздо большей степени, чем естественный язык, продвинуться в получении сложных выводов из некоторого множества исходных допущений.*

Актуальность рассматриваемой проблемы определяется тем, что современное состояние математического моделирования в политологии находится в стадии разработки. Как правило, разрабатываются модели систем по отдельным типам задач и проблем, что не соответствует современным вызовам, которые предъявляет общество к политологической науке.

Материалы и методы. *Статья, посвященная вопросам использования методов оптимизации в практике политологических исследований, содержит обоснование целесообразности и возможности использования вероятностных моделей для решения задач анализа сложных систем, обладающих поведением.*

Авторами выполнен анализ возможностей, который предоставляют формальные модели исследователю, определены те преимущества математических моделей, которые выявлены в процессе исследования по сравнению с моделями интуитивного характера, составленными в терминах естественного языка и предназначенными для обоснования принимаемых решений. Приведены примеры применения теории игр и процедуры многократного выбора к процессам формирования элитных групп и принятия решений в условиях несовпадения интересов.

Результаты и обсуждения. *Целесообразность применения методов формального моделирования в политологических исследованиях подтверждается практикой, предлагаемый ими собственный подход к применению методов исследования операций в практике моделирования сложных социальных процессов и систем требует дальнейшего интенсивного приложения к практике политологических исследований, а приведенные примеры подтверждают актуальность идеи комплексного использования формальных и неформальных моделей в политологии.*

Заключение. *Исследование проведенные авторами вносят вклад в развитие нового направления в системе политологических исследований, в основе которого лежат методы системного анализа и технология формального моделирования.*

Практическая ценность идеи состоит в использовании методов исследования операций в анализе поведения социально-политических систем и оригинальности интерпретации классических методов оптимизации, дополненной эвристическими методами математического моделирования.

Ключевые слова: языки выбора, теория игр, многокритериальный выбор в политологии, многосторонний и многократный выбор, элитные группы.

Abstract. *The urgency of the problem of formalization of political processes and systems and, as a consequence, the need to create tools that provide evidence-based decision-making in the management of systems whose behavior is determined by poorly formalized factors and uncertainty of conditions requires research aimed at the application of existing models and methods of research operations to the problems of political science. The models of political behavior presented in the article are based on the elements of game theory and the idea of optimization. It is obvious that the use of these tools for modeling social and political processes is a nontrivial task, the solution of*

which will allow to advance in obtaining complex conclusions from a set of initial assumptions to a much greater extent than natural language.

The relevance of the problem is determined by the fact that the current state of mathematical modeling in political science is under development. As a rule, we develop models of systems for certain types of tasks and problems that do not meet the modern challenges that society presents to political science.

Materials and methods. *The article is devoted to the use of optimization methods in the practice of political science research, contains a rationale for the feasibility and feasibility of using probabilistic models to solve the problems of analysis of complex systems with behavior.*

The authors analyze the possibilities that provide formal models to the researcher, identify the advantages of mathematical models that are identified in the process of research in comparison with models of an intuitive nature, compiled in terms of natural language and designed to justify decisions. Examples of application of the theory of games and procedure of multiple choice to processes of formation of elite groups and decision-making in the conditions of discrepancy of interests are given.

Results and discussions. *The expediency of using formal modeling methods in political science studies is confirmed by practice, their own approach to the use of methods of operations research in the practice of modeling complex social processes and systems requires further intensive application to the practice of political science research, and the examples confirm the relevance of the idea of integrated use of formal and informal models in political science.*

Conclusion. *The research carried out by the authors contribute to the development of a new direction in the system of political science research, which is based on the methods of system analysis and technology of formal modeling.*

The practical value of the idea is to use the methods of research operations in the analysis of the behavior of socio-political systems and the originality of the interpretation of classical optimization methods, supplemented by heuristic methods of mathematical modeling.

Key words: language choice, game theory, multicriteria choice in politics, multilateral and multiple selection, an elite group.

Introduction. A model is a display of one system in the signs and symbols of another system. By appointment, models can be cognitive and pragmatic; in the form of presentation: material, abstract, imitation; according to the type of similarity, it is customary to distinguish between indirect similarity models, conditional similarity, direct similarity (small copies).

Regardless of the basis chosen for the classification of models and whether the model belongs to one or another class of the model, they must have certain properties: target nature, inertness, adequacy, simplification of the structure compared to the modeled object/system. Models are used to study the properties and behavior of a complex system of any nature. The transition from a qualitative description of political science processes to quantitative indicators will allow mathematical processing of data in order to identify the features of systems/processes.

Stages of modeling:

1. Analysis of the object of modeling, observation and formulation of the problem (problematization).

2. Statement of the problem: determination of the goal and the task of modeling, that is, the indicator of the completeness of achieving the goal and the constraints that determine significant, insignificant and insignificant factors / conditions for the course of the studied process and / or functioning of the modeling object.

3. Construction of a conceptual model for establishing a logical correspondence between the model and the object of modeling. The complexity of this stage lies in the fact that a qualitative description of the problem by the researchers is carried out using different tools; the integration of disparate descriptions into a single model is an ambiguous process that requires knowledge of the subject area, which includes the object of modeling and the skills of creating models of various kinds (tabular, algorithmic, etc.) Thus, the use of operations research tools in political science allows using descriptions as a conceptual model situation like “zero-sum game”, “game with nature”, etc.

4. Transformation of a conceptual model containing a qualitative description of the modeling goal and the relationship of the utility function with the conditions for the implementation of the process into a mathematical model, that is, a formalized description. What pitfalls await the researcher at this stage of modeling? The researcher’s task on a variety of mathematical models to find such a tool that will reflect the meaning, goals and objectives of modeling. For example, when constructing a mathematical model of the process of forming regional elite groups, it is possible to apply the methods of game theory if the regional political process is considered as a situation with a divergence of interests. The same process can be represented in the form of a mathematical model of optimal choice, which is based on the idea of optimality, since, in essence, the selection of applicants takes place during the formation of the elite, and the researcher’s task is to build an adequate model that will provide an opportunity to analyze the relationships existing in this complex process

and prediction of the result. The idea of optimality is the basic idea of cybernetics. For strictly formalized tasks (technical, mathematical, operational), the concept of optimality has a rather specific definition, a clear mathematical formulation, moreover, the criterion by which the comparison and selection of alternatives in the decision-making process is carried out, as a rule, is correctly formulated. Thus, in economic management, the criterion of optimality is, as a rule, the maximum profit, in the tasks of production management - the maximum use of existing equipment or the maximization of the volume of output, in the problems of analysis of queuing systems - optimization of the structure and parameters of the system. Obviously, the idea of optimization is very effective both from the point of view of searching for optimal options, and from the point of view of the subsequent analysis of the results. As a rule, such an analysis makes it possible to evaluate the available reserves for improvement. Adapting the idea of optimality to the problems of political science, including the process of forming a regional elite, is of interest, both from a theoretical and practical point of view. Fundamental and applied research in order to study the mechanisms of the processes of social structuring, in which elites have a significant advantage in building relationships between themselves and society, must be transferred to a qualitatively different level. A scientific understanding of the challenges of our time such as system analysis and decision theory in a comparative way will help to clarify the theory of regional political processes and to actualize the problem of rotation and qualitative renewal of elites.

5. Search or development of a method of mathematical processing of the created model (solution).

6. Development of a solution algorithm and the actual solution.

7. Aggregation of the results of mathematical modeling and solving the problem in a system of qualitative descriptions in terms of a natural language.

8. Comparative analysis of the obtained and expected results, analysis of the assumptions / limitations made, model adjustment if necessary.

The practicability of using formal modeling in the study of political processes and systems does not require special argumentation, but it makes sense to note the significant advantages that distinguish formal modeling from intuition:

- political processes and systems, despite their seemingly stochastic nature, have certain a priori patterns that can be explicitly displayed in the form of a mathematical model; that is, formal models allow you to streamline and systematize mental descriptions of complex systems;
- the desire of the researcher to analyze the behavior of a complex system, its interaction with other systems, etc. get a forecast of the behavior of the investigated object;
- formal models make it possible to obtain a forecast and check its accuracy;
- formal modeling, as a tool in which entities of a higher level of complexity are used than in natural languages provide the basis for logical conclusions from the results of the study, which cannot be obtained in terms of natural languages;
- the mutual influence and development with other sciences: econometrics, biology, control theory, decision theory, etc.; interdisciplinary communication, the exchange of methodological techniques and modeling technologies understanding of the systematic phenomena and processes taking place in society [1].

Languages of choice. We define the concept of "choice" as an action that gives purposefulness to all activities. Indeed, in any area of human activity there comes a moment when actions can be different and lead to different results, and only one action can be implemented. How to make the right choice? What determines the ability (ability) to make the right decisions? Is there an algorithm that can be taught and / or learned to make the right decisions? Obviously, a fully formalized algorithm can be built for well-studied problems with a clearly defined structure and specific goals. As an example, you can use the well-known technique "analysis of a specific situation - ACS", and in a variety of cases, this technique can be used as a simulator for staff (accidents, emergencies), psycho-training, forms of classes, etc. It is unlikely that this technique is useful and effective in the study of poorly structured problems.

What are the methods and techniques for substantiating decisions for tasks of this type? Is it even possible to talk about modeling in such situations?

In some cases, simulation gives good results. At present, a combination of methods has gained wide application: formalized methods and computer modeling, combined with a person's ability to solve informal tasks. The number of selection problems is diverse, the methods for making the right decision (choice) are also infinitely many; we agree that a choice is an action on a set of alternatives, as a result of which a subset of the chosen alternatives is obtained (as a rule, this subset consists of one alternative). It is clear that the choice can be made only after comparing the alternatives, the

comparison should be carried out according to a certain parameter – the preference criterion. In fact, the problem of choice is reduced to a process consisting of two stages:

- definition of many alternatives on which to make a choice;
- determination of goals for the achievement of which a choice remains to be made.

As a rule, the number of alternatives is of course, their assessment is carried out according to one or several criteria of a quantitative or qualitative nature, the selection mode can be single or multiple. If the choice is made in conditions of certainty, then the consequences of the choice can be accurately known. If the choice is made under risk conditions, then with the known probabilities of possible outcomes, one can make a forecast about the consequences of the choice with a certain degree of probability. If the choice is made under conditions of uncertainty, that is, the introduction of probability is not allowed, then the consequences of the choice may have an ambiguous outcome.

Responsibility for choice can be one – or multilateral. The degree of consistency of goals in multilateral choice can take on different meanings: from complete coincidence of interests (cooperative choice) to complete non-coincidence (choice in a conflict situation). It is this variety of options and their combinations that leads to a variety of selection tasks.

It is proposed to consider the possibility of using three tools in formal modeling (decision making): criteria-based selection, the language of binary relations and the language of choice functions.

Criteria choice – by definition, each individual alternative of those over which the action is carried out can be characterized by a specific number - the value of the criterion. The name of this criterion, as a rule, does not have fundamental significance (quality criterion, efficiency criterion, etc.), it is important that the alternatives are compared according to this criterion. Thus, if a is some alternative from the set A and for all alternatives the function F (a) can be defined, which is called a criterion, then it is quite natural to consider that the one that has the highest criterion value is considered the best (optimal) alternative

$$A\ opt = \max \{F(x)\}$$

The task of finding the optimal alternative is quite simple in formulation and, as a rule, difficult to solve, since the choice of a solution method depends on many aspects (the nature of the set A, the type of this set, the nature of the criterion, etc.) Moreover, the criterion language of choice, that is, an attempt to assess the situation with a single number is a significant simplification in the study of systems and their models. In real practice, it becomes necessary to conduct a comparative assessment according to several, qualitatively different criteria.

Actual practice shows that assessment by one criterion is, as a rule, inadequate. In this connection, it will be quite natural to assume that estimates according to several criteria will be more complete and relevant. How then to compare alternatives for choice? Of course, we can assume that out of the whole set of alternatives there is one for which the values of all the criteria will be the greatest; we will consider this alternative optimal. But what if the values of the criteria are not the greatest? How are multicriteria problems solved?

Ways to solve multicriteria problems

1. The multicriteria problem is reduced to the single-criterion by introducing supercriteria. The essence of the method is that the "weight contribution" of each criterion to the supercriteria is determined and an ordered sequence of alternatives is built. The statement of the problem is reduced to maximizing the supercriterion.

2. From the set of criteria, one, the most important, is selected; the remaining requirements act as restrictions. With this approach, the statement of the choice problem is reduced to finding the conditional extremum of the main criterion, and the restrictions on additional criteria may not be so stringent. So, for the task of forming an elite group of experts in political science, the main criterion may be the degree of professional competence of an expert, restrictions on entry into domestic and international communities, publication activity, etc.

All of the above can be described as a problem with criteria of different importance. In the framework of the same approach, it makes sense to talk about solving multicriteria problems by the method of assignment. The essence of the method is that particular criteria are sorted by non-increasing their importance, then the optimal alternative is determined by the first of the particular criteria, then the size of the “concession” is determined, that is, the amount by which we agree to reduce the value of the most important criterion in order to increase the value next criterion in importance and get the best alternative, etc.

3. The third method for solving multicriteria problems is the search for an alternative with desired properties. The essence of the method is to find an alternative that satisfies these requirements using predefined values of particular criteria. The Pareto set is a formalized method of multi-criteria selection, according to which the preference for one alternative over another is given only if the first is better than the second by all criteria. If the preference for one criterion

diverges from the preference for another, then such alternatives are recognized as incomparable. So in the process of pairwise comparison, all the worst-case alternatives by all criteria are discarded, and the remaining alternatives that are incomparable among themselves remain. To find the best alternative, particular criteria are compared, if their maximum values refer to one alternative, then the selection is complete, and the accepted alternatives form a Pareto set. If one of these incomparable alternatives is required to choose, then it is more advisable to apply additional criteria and (or) means of choice (expert estimates, lots, etc.).

The language of binary relations. The essence of the selection procedure by the method of binary relations is that the criterion by which alternatives are evaluated is not specified. For each pair of alternatives, a preference system is established, using which you can choose the preferred alternative, or formulate a statement about their equivalence or incomparability. It should be remembered that the preference relation for the pair does not depend on other alternatives. The system of preferences can be defined in a matrix way, by simple enumeration, using a directed graph.

The language of choice functions is a system for selecting alternatives in the conditions of their mutual dependence and / or in conditions of searching for unique alternatives for which the terms are "optimality criterion", "preference", etc. do not make sense due to the lack of a precedent for comparison with analogues.

Multilateral (group) choice. Voting. The problem of group choice can exist in at least two typical situations: when opinions coincide with the problem and when opinions differ, that is, in a conflict situation. If the opinions coincide, the statement of the problem has the following form: let there be n individual preferences on the set of alternatives A, the task is to work out some new relation R, which will coordinate individual choices, that is, it expresses a "general opinion". Obviously, this new attitude must somehow be connected with individual choice. This can be an arbitrary function, the main thing is that it correctly displays the features of each specific option.

The coordination of individual and general opinions is carried out according to the majority rule, which determines that the alternative with the highest number of votes is considered accepted. Advantages of this rule: simplicity. Disadvantages: the result of such a choice is not always a criterion of truth, the second disadvantage is what is not defined – the "majority" is how much? New terms appear: simple majority, overwhelming majority, absolute majority, consensus, veto, etc. The situation is unclear with an even number of participants in the choice. The main drawback is that the impossibility of choosing from a variety of alternatives implies, theoretically, a refusal to make a decision, and, therefore, from further actions. In practice, such situations are extremely rare - refusal to take further actions is usually unacceptable; to make a decision, it is necessary to develop additional procedures that reduce the number of failures:

- alternatives are maximally specified, between which consensus does not allow a choice;
- a test of the effectiveness of alternatives is collectively built and a consensus is made about it, the test, fairness and the consent of all participants in the procedure to follow the test results;
- a test is carried out and its result is used.

Group choice, as a procedure, has not only advantages and disadvantages, it is filled with paradoxes, one of which is the Arrow paradox: on a set consisting of three alternatives a1, a2, a3, three experts need to make a choice.

Alternatives are presented in pairs, it is obvious that each expert, having his own system of preferences, will build his own series: a1> a2> a3, a2> a3> a1, a3> a1> a2. Most rule does not work here because:

- in pair 1-2 a1> a2
- paired 2-3 a2> a3
- in pair 3-1 a3> a1

If we accept the additional condition that after each step of the vote the rejected alternative is replaced by a new one, then the result depends on the order in which the alternatives are presented. The problem of choice can be solved after the introduction of additional restrictions:

- the choice will be considered consistent if: the number of experts does not coincide with the number of alternatives, as a rule, the number of experts n> = 2, the number of alternatives> = 3;
- the choice should be monotonous, that is, if the group choice prefers alternative X, then this decision should not change if one of the experts who previously rejected X changed his preference in her favor;
- the alternatives should be independent in nature and not connected with each other: if changes in individual preferences have not touched on some alternatives, then in the new group ordering their order should not change
- condition of sovereignty of alternatives;
- condition for the absence of dictatorship.

So, the group selection procedure involves the use of various ranking tools, criteria-based selection, the transition to a single digital scale, the creation of coalitions.

Examples of mathematical models of political behavior. The idea of optimality as the basis of the elite formation process.

Adapting the idea of optimality to the process of forming a regional elite is of interest, both from a theoretical and practical point of view. Fundamental and applied research is needed to study the mechanisms of the processes of social structuring, in which elites have a significant advantage in building relationships between themselves and society.

Ethnopolitical elite of the region is characterized by ethnically homogeneous social communities, which are the subjects of the most important strategic decisions, possessing the necessary resource potential for this and lobbying the interests of certain groups in power structures and economic relations. Decision-making processes in elite groups, built on the principles of subjective assessment of alternatives, must be transferred to a qualitatively different level. The topic of scientific research is relevant for the region, since the formation of elite groups is a diverse process in its components. Its content and dynamism are affected by the institutionalization of power structures associated with a change in the type of political system, the formation and functioning of party structures, and the activities of the leading elite. The use of mathematical models, systems analysis methods and optimal choice theory will allow for timely understanding of the dynamics, trends and characteristics, the socio-political practice of the region, the formation and implementation of the regional elite.

The emergence in the regions of players interested in accumulating administrative, political, and material resources gave rise to a number of serious problems: the discrepancy of interests in the power-property relations, the objectively existing system of "contractual relations" in the decision-making system, professional incompetence of representatives of administrative structures, conservatism in the formation of the elite [3].

The transition from mental models of the formation of elite groups to formal models is proposed to be carried out using the methodology of multiple selection (selection, selection), taking into account the following factor:

- the share of the elite group in the totality of elements;
- the nature of the change in quality X of each element: here X is the criterion quantity characterizing the property of the element;
- elimination rule from the elite group: accidental retirement, elimination of the best or worst;
- the rule of inclusion of new elements in the elite group: in accordance with the previous standard, with a modified standard, or in case of refusal of the previous standard after the first selection;
- temporary relations between the moments of the next replenishment of the elite group.

Different combinations of these factors make it possible to build different types of models.

The "Applicant – Recommender" Model. The mechanism for the formation of an elite group in accordance with this model is that if there is a vacancy in the elite group, an element (applicant) taken at random from a general population is compared with an random element taken from the elite (recommender). If the estimated indicator of the applicant is not less than the estimated indicator of the recommender, the applicant takes a vacant place, otherwise a new pair of "applicant –reference" appears and the nature of the change in the quality of the elite group will depend on which elements, better or worse, last longer group. If the worst elements last longer, the elite will degrade, since the worst often act as recommenders. With an increase in the lifetime T (x) of an element with an increase in the value of the estimated indicator, the worst elements are eliminated first of all, since the highest quality elements fall into the recommenders, that is, the average quality of the elite group grows.

The "weeding and harvesting" model. The idea of "weeding" is to remove m worst elements from an elite group and replace them with randomly taken m elements from the main group. Obviously, when replaced, elements can get into the elite both better and worse than deleted ones, but the next step again removes the worst, etc. As a result, the elite group is progressing. It is proved that the optimal strategy of weeding, which gives the highest marginal average quality, consists in removing one element at each step. The essence of the inverse procedure, called "harvesting", is that the best elements are removed, and the opposite effect is achieved accordingly: removing the one best element at each step brings maximum harm.

Comparing the models "*applicant-recommender*" and "*weeding - harvesting*", we note that the first model, unlike the second, does not imply the activity of an elite group.

The "delegation" model. The main difference from previous models is that activity in the formation of the elite is allowed, in addition, in this procedure there is no comparison of applicants with members of the elite. Delegation order:

- N elements are randomly selected from the total set – a delegating sample;
- these elements are ordered by the value of the estimated indicator;
- The element with the maximum value is credited to the elite.

Depending on the number of vacancies, the procedure is repeated n times.

It is proved that the higher the requirements for the quality of the elite group, the greater should be the size of the delegating sample. The advantage of this model is that it protects the elite from degradation.

The "Arms Race" model. The well-known Richardson model, expressed by a system of linear equations, takes into account three components in the process of opposition of two systems:

- armament costs / armament level at time t, which each system incurs and which directly depend on the enemy armament level S1 (t), S2 (t);
- expenses for social projects, which are, to a certain extent, a limiter of the cost of weapons;
- some constant value that reflects the level of past grievances, c and d for each player, respectively; the coefficients c and d can take positive and negative values depending on the degree of friendliness of the relations of opponents at the current time.

The mathematical model has the form:

$$S1 (t + 1) = a1 * S2 (t) - a2 * S1 (t) + c$$
$$S2 (t + 1) = b1 * S1 (t) - b2 * S2 (t) + d,$$

The terms of the equations S1 (t), S2 (t) are a quantitative expression of the magnitude of the levels of arms at time t, S1 (t + 1), S2 (t + 1) at time t + 1. A quantitative expression of the size of the threat is reflected in the terms a1 S2 (t) and b2 S1 (t), because the larger these numbers, the greater the number of weapons on the opposing side. The value of the expenses is reflected in the terms a2 * S1 (t), and b2 * S2 (t), since due to these expenses the level of armaments decreases next year.

The main advantages of the Richardson model, which can be attributed to the class of dynamic models: simplicity, the ability to make a short-term forecast and stability. At the same time, the situation taken as the basis of the Richardson model can be represented in the form of an antagonistic pair game with zero sum.

Game theory, as a mathematical apparatus used to build models of real conflict situations, adapted to political processes (formation of elite groups, arms race, etc.) provides researchers with the opportunity to study the logical consequences of the observed rules and correctly determine the alleged relationships between the phenomena [4]. The game, as a mathematical model of a real conflict situation, allows you to provide a formalized description of the problem, while the model can be descriptive, constructive or normative. Descriptive models are a description of a complex system in terms and concepts of mathematical modeling, but do not give recommendations on the choice of behavior. Models of a constructive form show how to create a game, what type / type / class the game is suitable for the system under study. It is advisable to formulate strategies for optimal behavior using normative models, that is, those that determine the norm of behavior in the current situation.

The "Arms Race" model is like a zero-sum game. An interpretation of the Richardson model in terms and definitions of game theory is proposed:

A1, A2 - players in relation to whom there is a certain opposition; the existing confrontation determines the amount of financing / investment in strengthening their defense capabilities, respectively V1, V2.

Players cannot afford to invest all resources in armaments, as they have certain obligations on social projects; each player's resources are limited and increasing the share of social projects will certainly lead to lower weapon costs.

Consequently, the situation with the arms race can be represented as a pair game with zero sum, where each player has two behavioral strategies Vi (i = 1,2) - weapons costs, Si (i = 1,2) - costs for social projects ; the total cost for each player is a constant value.

According to the existing classification of the game are divided:

- by the number of players: doubles, multiple and single player game or game with nature;
- in relation to players to the outcome of the game: games with a zero amount, when the gain of one player is equal to the loss of another and games with a non-zero amount in which the gain of one player does not mean the loss of the other.

As a rule, all games of a sports type, paired and multiple, are referred to zero-sum games [5].

It is advisable to position the political systems and processes occurring in them as a multiple game with a non-zero sum, while the game can be cooperative in nature, when players create a coalition to achieve the goal and, under

certain conditions, can win (“a game without losers”). Such games include a game called the prisoner's dilemma. The idea of this model is that the participants in the game have the opportunity to implement two strategies: deceiving the enemy and cooperation. The model has a fairly wide application: with its help, you can make a description of the situation with arms control; monitoring the implementation of business contracts, mutual control of the state and farmers in relation to food prices; corporate conspiracy of manufacturers to withhold prices of goods, etc. The matrix form of the game is presented in table 1, the payoff sizes are conditional numerical values.

Table 1

Generalized matrix of the game "The prisoner's dilemma"

	Player 2 - Cheating	**Player 2 - Collaboration**
Player 1 - Cheating	d	D, c
Player 1 - Collaboration	c, D	C

Rules of the game: two players and an expert participate in the game. Each player has two cards, symbolizing the choice of strategy on one is written "Collaboration", on the other - "Cheating". Each player puts one card in front of the expert with its face down (that is, no one knows someone else's decision, although knowledge of someone else's decision does not affect the analysis of dominance). The expert opens the cards and determines the win, in accordance with the rules: if both chose to “collaborate”, both receive C. if one chose “Cheating”, the other “Collaboration” - the first receives D, the second - from, if both chose “Cheating” - both get d; moreover, D> C> d> c. If the choice is repeated many times, the total gain from cooperation should be greater than the total gain in a situation when one cheats and the other does not, that is, condition 2C> D + c must be fulfilled.

How does the model work? Possible choices can be described using a criteria-based approach when using the maximin criterion: choosing the best of the worst possible options. This is the dilemma of choice. The iterative nature of the game, that is, its repeated repetition, allows each side to repeatedly punish the other for deception. In situations of positional warfare, or the fulfillment of the terms of the contract / agreement, players who are unable or unwilling to cooperate have little chance of survival. This largely explains why cooperation really exists in a world where there is neither compulsion to execute contracts, nor agreements between players and where it is beneficial to deceive an opponent trying to cooperate.

The model can be adapted and used to study competitive situations in socio-political processes, for example, determining the appropriateness of using threats, breaking a deal, bluffing in negotiations, etc.

Conclusion. The complexity of modeling political processes and systems is due to two factors. The first factor is the difference in the order of building the model from a similar process for economic, technical, etc. systems. In socio-political systems, the construction of the model begins with the observation of simple phenomena, the behavior of simple systems, which are the participants in the process. Modeling complex processes and conducting political analysis based on a formal model should complement the models built in terms of natural language. The existing variety of mathematical models is not an obstacle to their use, but requires careful analysis of the data, since incorrectly made assumptions reduce the validity of the model, which depends not on the mathematical methods used, but on the relevance of the assumptions, to a minimum. Separate requirements must be presented to the order of experimental verification of models for compliance with the goal and the transfer of the obtained numerical results into natural language terms.

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