Chapter 11
Social processes and politics

In this chapter, we analyze such subjects as social groups, political parties, and criminal gangs. Practical use of the model in this area must be preceded by empirical study, which would identify units playing the role of subjects along with their sets of possible actions and the relations of conflict or cooperation between them.

11.1. Choice of economic system

Let us imagine a country where the choice of economic system is being discussed. There are forces preferring socialist economics and the nationalization of large private property. There are also opposing forces proposing economics based on a free market. Socialist economics will be designated α, and free market β. Thus, the universal set consists of two incompatible elements: α and β. The set of alternatives is

$1 = \{\alpha, \beta\}$ – not realizable,
$\{\alpha\}$ – choosing socialism (realizable),
$\{\beta\}$ – choosing a free market (realizable),
$0 = \{\ \}$ – inaction (realizable).

The social forces in the country are as follows:

political elite	a,
military	b,
secret police	c,
population	d,
business	e.

Suppose that the political elite is allied with the population and the secret police; the military forces are allied with population and in conflict with the political elite, the secret police, and business. The secret police are allied with the population, and business is in conflict with all others. These relations are depicted in Fig.11.1.1:

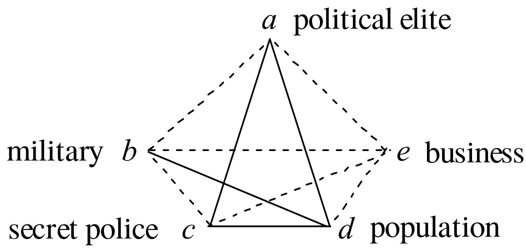

Fig. 11.1.1. Graph of relations

The political elite must make the decision concerning the choice of an economic system. Other social forces can influence the decision of the elite. The graph in Fig.11.1.1 is decomposable; it corresponds to the polynomial

$$e + d(b + ac) \tag{11.1.1}$$

and the diagonal form

$$\begin{array}{lllll} & & & & [a]\,[c] \\ & & & [b] + [ac] & \\ & & [d]\,[b + ac] & & \\ & [e] + [d(b + ac)] & & & \\ [e + d(b + ac)] & & & & . \end{array} \tag{11.1.2}$$

The equation for the political elite (a) is:

$$a = e + d\,(b + ac). \tag{11.1.3}$$

Let the military demand that a certain course of economics development be chosen:

$$b = \overline{0} = \{\alpha, \beta\} = 1\,.$$

The secret police demands socialism:

$$c = \{\alpha\}\,.$$

The population is also willing to live under socialism:

$$d = \{\alpha\} .$$

Business demands a free market:

$$e = \{\beta\} .$$

We substitute these values into (11.1.3) and obtain

$$a = \{\beta\} + \{\alpha\}(1 + a\{\alpha\}) \tag{11.1.4}$$

or

$$a = 1 = \{\alpha, \beta\}. \tag{11.1.5}$$

Thus, under such a set of influences, the political elite chooses an active course; it may decide to build socialism or to develop a free-market economy; inaction is excluded.

Consider several other cases. For example, all social blocs are happy with the existing situation and do not want any change:

$$b = 0,\ c = 0,\ d = 0,\ e = 0.$$

We substitute these values into (11.1.3) and find that

$$a = 0.$$

If all blocs wish to have socialism,

$$a = \{\alpha\},$$

or capitalism

$$a = \{\beta\}.$$

In all these cases, the political elite obeys unanimous desire of the social blocs.

Let business (e) begin building affordable housing and clinics, create funds for the poor, etc., to attract the population (d). These measures change the population's desire to have socialism and incline the political elite to leave everything as is. The others' influence remains the same as in the first example. We substitute values $b = 1$, $c = \{\alpha\}$, $d = 0$, $e = \{\beta\}$ into equation (11.1.3) and obtain

$$a = \{\beta\} . \tag{11.1.6}$$

The change of these influences on the elite results in the choice of a free-market economy.

11.2. Appointment of a Prime Minister

The president (a) must appoint a Prime Minister. There are three candidates. α, β, γ, and six political parties, b, c, d, e, f, g. The universal set is $\{\alpha, \beta, \gamma\}$; the set of alternatives consists of eight elements.

Let the graph of relations be as follows:

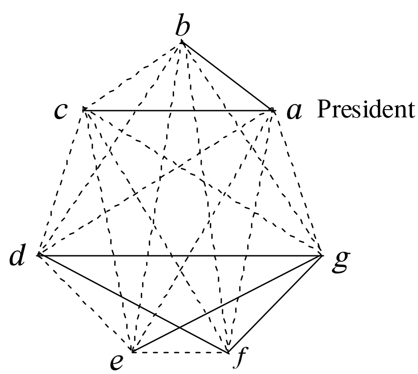

Fig. 11.2.1. Graph of relations

The subjects are organized in two groups: a, b, c and d, e, f, g, which are in conflict with each other. Inside the first group, a cooperates with b and c; b and c are in conflict. Inside the second group, g cooperates with d, e, and f; e is in conflict with d and f, who cooperate with each other. The graph in Fig. 11.2.1 corresponds to the polynomial

$$a(b + c) + g(e + df), \tag{11.2.1}$$

and the diagonal form

$$\begin{array}{llllllll}
 & & & & & & & [d]\,[f] \\
 & & & [b] + [c] & & & [e] + [df] & \\
 & & [a]\,[b + c] & & & [g]\,[e + df] & & \\
 & [a(b + c)] & & & + [g(e + df)] & & & \\
[a(b + c) + g(e + df)] & & & & & & , &
\end{array} \tag{11.2.2}$$

and the equation for a is

$$a = a(b + c) + g\,(e + df). \tag{11.2.3}$$

Let party b incline the President to appoint α; party c inclines him not to appoint α, i.e., to appoint either β or γ. Parties d and f suggest appointing γ, party e wants the President to appoint β, and party g favors α. Thus, the values of the parties' influences on the President are as follows:

$$b = \{\alpha\},\ c = \{\beta, \gamma\},\ d = \{\gamma\},\ e = \{\beta\},\ f = \{\gamma\},\ g = \{\alpha\}.$$

Substitute these values into (11.2.3):

$$a = a\,(\{\alpha\} + \{\beta, \gamma\}) + \{\alpha\}\,(\{\beta\} + \{\gamma\}\,\{\gamma\}). \tag{11.2.4}$$

After computation we obtain the equality

$$a = a. \tag{11.2.5}$$

In this situation, the President has freedom of choice. He can appoint any candidate based on other factors; he even can refuse to make the appointment by choosing the empty alternative $\{\ \} = 0$.

What would happen if all parties insisted in appointing the same candidate, for example α? Assuming all variables, b, c, d, e, f, g, equal to $\{\alpha\}$ and substituting them into (11.2.3), we obtain

$$a = \{\alpha\}, \tag{11.2.6}$$

i.e., the President would appoint α. If all parties incline the

President not to appoint anyone, he will comply, because for the values of variables equal to { },

$$a = \{\ \}. \tag{11.2.7}$$

Consider some changes to the scenario. Parties d, e, f and g refuse to collaborate with the President. Party b continues to support α's appointment, and party c begins to support γ. Thus,

$$b = \{\alpha\},\ c = \{\gamma\}. \tag{11.2.8}$$

The new situation corresponds to graph

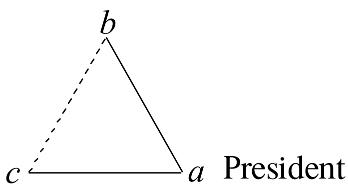

Fig. 11.2.2. Graph of relations

Find the polynomial

$$a(b + c), \tag{11.2.9}$$

and the diagonal form:

$$[a(b + c)]^{[a]\,[b + c]^{[b] + [c]}}, \tag{11.2.10}$$

and the equation for a:

$$a = a(b + c) + \overline{a}\ . \tag{11.2.11}$$

By substituting the values of influences from (11.2.8) into (11.2.11), we obtain

$$a = \{\alpha, \gamma\}a + \overline{a}\ . \tag{11.2.12}$$

In this equation, $A = \{\alpha,\ \gamma\}$, $B = 1$, i.e. $A \subset B$, thus, the equation does not have a solution, which means that the President is in a state of frustration and cannot make a choice.

11.3. Urban gangs

Five gangs operate in the city. Some of them cooperate, others are in conflict. Their activity has sharply increased. What is the reason? We assume that each gang faces a choice between active behavior (1) and passive behavior (0). We assume also that each gang inclines every other gang either toward activity or passivity. Suppose that after analyzing the situation we construct the following graph:

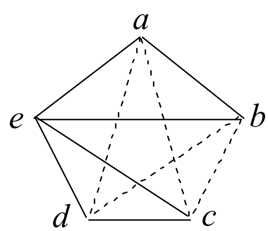

Fig. 11.3.1. Graph of gangs' relations

This graph corresponds to the polynomial

$$e(cd + ab) \tag{11.3.1}$$

and the diagonal form

$$\begin{array}{llllll} & & & [c]\,[d] & & [a]\,[b] \\ & & [cd] & & +\,[ab] & \\ & [e]\,[cd + ab] & & & & \\ [e(cd + ab)] & & & & \equiv 1. & \end{array} \tag{11.3.2}$$

The group of gangs is in a superactive state, and each gang is also individually superactive. As was shown in Chapter 7, the state of superactivity does not depend on subjects' mutual influences; it depends on the persistence of the relations represented by the graph in Fig. 11.3.1. This is the reason the gangs' activity remains high.

The police trying to deal with the situation have only enough funds to neutralize the activity of one gang. For example, if the police neutralize gang a, the graph of relations becomes

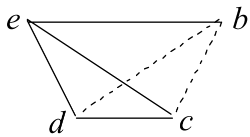

Fig. 11.3.2. Graph of relations after gang a is neutralized

This graph corresponds to the polynomial

$$e(b + dc) \tag{11.3.3}$$

and the diagonal form

$$\begin{array}{llll} & & & [d]\,[c] \\ & & [b] + [dc] & \\ & [e]\,[b + dc] & & \\ [e(b + dc)] & & & \equiv 1. \end{array} \tag{11.3.4}$$

A group consisting of four gangs, b, c, d, and e, remains superactive, so that the neutralization of gang a does not eliminate the gangs' superactivity.

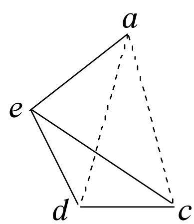

Fig. 11.3.3. Graph of relations after gang b is neutralized

How would the neutralization of gang b change the situation? The new graph of relations is given in Fig. 11.3.3. It corresponds to the polynomial

$$e(a + dc), \tag{11.3.5}$$

and the diagonal form

$$\begin{array}{llll} & & & [d]\,[c] \\ & & [a] + [dc] & \\ & [e]\,[a + dc] & & \\ [e(a + dc)] & & & \equiv 1. \end{array} \qquad (11.3.6)$$

The group consisting of a, c, d, e is also superactive, so that neutralization of b will not diminish the activity of the others.

Similar analyses for gangs c or d demonstrate that neutralizing one of them leaves the group of remaining gangs superactive. What happens, however, if gang e, which cooperates with all other gangs, is neutralized? The new graph appears as follows:

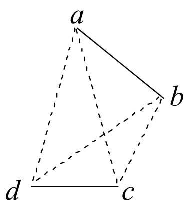

Fig. 11.3.4. Graph of relations after gang e is neutralized

It corresponds to the polynomial

$$a\,b + c\,d \qquad (11.3.7)$$

and the diagonal form

$$\begin{array}{llll} & & [a]\,[b] & [d]\,[c] \\ & [ab] & & + [dc] \\ [ab + dc] & & & \not\equiv 1 \end{array} \qquad (11.3.8)$$

that is, not identically equal to 1. For example, for $a = 0$, $b = 0$, $c = 0$, $d = 0$, its value is 0. Thus, the neutralization of gang e makes the state of the group of gangs not superactive. So, within the model's framework, the neutralization of gang e will diminish the level of criminal activity in the city.