

# Дослідження молодих науковців

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## COMPONENT ANALYSIS OF THE DEVELOPMENTAL VECTOR OF URBAN AND DISTRICT SOCIOGEOSYSTEMS (ON EXAMPLE OF KHARKIV AND VOLYN REGIONS OF UKRAINE)

*The article deals with methodological questions about using component analysis to analyze the socio-economic development and the health care system development of urban and district sociogeosystems. It is proposed together with a common vector analysis to explore its projection on the axis of space – for the time-derivative of each process parameter in set of changes that makes it possible to study the development of sociogeosystem at the level of each parameter. Specific examples of using this method for the analysis of socio-economic development of the urban sociogeosystem of Kharkiv region and for analysis of health care system development of the district sociogeosystem of Volyn region are given.*

**Key words:** social and economic development, health care system, urban sociogeosystem, district sociogeosystem, developmental vector, time-derivative of parameters.

**Євгенія Телебенєва, Тарас Погребський. КОМПОНЕНТНИЙ АНАЛІЗ ВЕКТОРУ РОЗВИТКУ МІСЬКИХ І РАЙОННИХ СОЦІОГЕОСИСТЕМ (НА ПРИКЛАДІ ХАРКІВСЬКОЇ ТА ВОЛИНСЬКОЇ ОБЛАСТЕЙ УКРАЇНИ).** У статті розглянуто методологічні питання з використання компонента аналізу для аналізу соціально-економічного розвитку та системи охорони здоров'я міських та районних соціогеосистем. Пропонується разом із загальним аналізом вектора досліджувати його проекції на осі простору – за часовими похідними кожного параметру процесу встановлюються їх зміни, що дає можливість вивчати розвиток соціогеосистем на рівні кожного параметру. Наводяться конкретні приклади використання методики для аналізу соціально-економічного розвитку міської соціогеосистеми Харківської області та аналізу системи охорони здоров'я районної соціогеосистеми Волинської області.

**Ключові слова:** соціально-економічний розвиток, система охорони здоров'я, міська соціогеосистема, районна соціогеосистема, вектор розвитку, часові похідні параметрів.

**Євгенія Телебенева, Тарас Погребський. КОМПОНЕНТНЫЙ АНАЛИЗ ВЕКТОРА РАЗВИТИЯ ГОРОДСКИХ И РАЙОННЫХ СОЦИОГЕОСИСТЕМ (НА ПРИМЕРЕ ХАРЬКОВСКОЙ И ВОЛЫНСКОЙ ОБЛАСТЕЙ УКРАИНЫ).** В статье рассмотрены методологические вопросы по использованию компонента анализа для анализа социально-экономического развития и здравоохранения городских и районных социогеосистем. Предлагается вместе с общим анализом вектора исследовать его проекции на оси пространства – за временными производными каждого параметра процесса устанавливаются их изменения, что дает возможность изучать развитие социогеосистем на уровне каждого параметра. Приводятся конкретные примеры использования методики для анализа социально-экономического развития городской социогеосистемы Харьковской области и анализа системы здравоохранения районной социогеосистемы Волинской области.

**Ключевые слова:** социально-экономическое развитие, система здравоохранения, городская социогеосистема, районная социогеосистема, вектор развития, временные производные параметров.

**The relevance of research.** With the development of the methodology of scientific research increases the degree of abstraction methods and techniques of knowledge. Today is particularly noticeable methodological evolution of science that have not yet reached a high level of formalization of the conceptual apparatus and so new, not even a very big step in this direction give very reliable results. An illustration of this thesis can be a history of the evolution of the use of modeling techniques in the natural sciences, particularly in the geosciences. As you know, mathematical modeling is a highly efficient and advanced scientific methods of scientific knowledge, which is fully based on the phenomenon of similar natural and social processes. Huge potential of creation and study of models of different processes, combined with ever-increasing capabilities of computer equipment and technology push back the horizons and broaden perspectives of scientific knowledge, the results obtained today a few years ago might seem fantastic. Especially difficult to predict the future success of the application of simulation based on a synergistic improvement and

system implementation.

Geography, due to its integrative properties of concepts and terminology, creating new images, ideas about the world, which penetrate the methodology and the domain of other sciences and promote their development. This is especially true for the study of objects for which are important spatial aspects. Field mapping properties of objects which are specific for geography, became more formalized and thus became the basis of modern high-tech computer technology. Nowadays cartographic models and works are essential elements of any geographical research and numerous reference books focused on ordinary users. Thus, the study and improvement of methodological possibilities of modern geography is an important research task.

**Analysis of previous studies.** Geography is one of those sciences that are rapidly progress through the use of methods of formal logic and simulation. Today accumulated vast experience in the use of quantitative methods in geography, covered in thousands of scholarly monographs, articles and educational publications, developed own approaches of modeling social and geographical processes and phenomena. The method of component analysis is no exception. Application of this

method in the social-geography can be seen in the works of Niemets K. [2], Niemets L. [3], Yakovleva Y. [6], Grushka V. [1] and others.

**The purpose of this paper** is to describe the methods of analysis of the local developmental vector of any geographic object on an example of social and economic development of urban sociogeosystem of Kharkiv region and health care system development of district sociogeosystem of Volyn region.

**The main material.** To understand and to explain the dynamics of social and economic development and health care system development requires a detailed analysis of substantial changes of social and economic development and health care system development for the corresponding period of time calculated in a multidimensional attribute space (MAS), for which we used component analysis of the developmental vector. Its idea is based on the definition of vector projections on each axle of MAS with subsequent analysis of their changes. This makes it possible to move from an overall assessment of social and economic development and health care system development in the integral form to the assessment for individual components (parameters), which makes sense, for example, in the tasks of planning, forecasting and optimization of development management (in the context of the concept of sustainable development), management of resources and more. In such problems it is important to know the fate ("contributions") of each parameter in the overall development of the sociogeosystem and to find the "bottleneck" of this process to accurately targeted intervention [2, 4].

From the standpoint of mathematics indicated task is to calculate the time derivative of each process parameters for the relevant accounting period of time and essentially has two options solution: qualitative and quantitative. Qualitative decision involves determining only the sign of the time derivative, the finding of quality parameter changes (increases, decreases or no change), followed by coding events at a nominal scale. Quantitative decision is to determine not only the characters, but the size of the original, which gives a more accurate estimate of the relative scale events, and do not require the use of indexes and output (measurable) values. The fact that the procedure for calculating the index is constructed so that regardless of the content of the parameter (positive or negative) indices clearly defined as directly proportional to the increase in symptoms or quality of the process. For example, a "negative" rate – death rate has an index, which corresponds to an increase in reduction rate. In this paper, we limited only by qualitative descriptions in solution of the problem, as the most common.

Calculating the time derivatives have three possible outcomes:

1) if the parameter during the calculation period remained unchanged (the process by a considerable margin stable), the derivative is 0 and that result is assigned code 0;

2) if the parameter is reduced (the process behind it regresses), the derivative is negative, in accordance with result code -1;

3) if the parameter increases (process behind it

progresses), the derivative is positive, in which case the result code 1.

The proposed code selection (split into three groups for a nominal scale) is suitable for further analysis. Thus, in the aggregate indices of statistical parameters of social and economic development and health care system development, its enough to calculate the amount of codes of corresponding derivative groups. The total amount of code shows adjustments prevail. For general research of the process qualitative analysis is sufficient to assess the overall changes of the vector components. In solving applied problems of process of control, optimization, monitoring or forecasting, is necessary to make quantitative component analysis that determines the specific corrective change in control process parameters [2, 5].

From the above it is clear that specific recommendations for improving of social and economic development and health care system development can be obtained by analyzing the change in the index of statistical parameters of a specific sociogeosystems. This article presents the results of the analysis for two sociogeosystems. One – urban sociogeosystem as an example of the worst dynamics of social and economic development and the second – district sociogeosystem, as an example of the best health care system development .

Based on the distribution of urban and regional sociogeosystems on the phase plane as an example were chosen the city of Izjum (Kharkiv region) and Lubomil'skiy district of Volyn region. For ease of analysis the data in tables were grouped by the largest amount of change of the index codes in ascending order. Accordingly, in the first lines of tables were grouped the most problematic parameters that need attention in the first place, and in the end – the parameters by which sociogeosystems has steady progress.

As seen from table 1, during the research period in the city of Izjum is seen a steady or partial deterioration of socio-economic development. The result of above is a decline in the level and quality of life, unemployment, the outflow of the working population of the city. The priority of local authorities and other public institutions is to provide people with jobs, modernization of production, providing enterprises with modern technology and equipment. Equally important is the improvement of social protection.

Practical absence of any dynamics for the city of Izjum is observed in terms of the number of registered citizens who are not engaged in economic activity (which remains unchanged) and indicators of capital investment in the city, because in the city there are no businesses with new technologies and equipment, resulting of which is non competitiveness of enterprises in the global market and closing of them.

Variable but generally almost zero dynamics observed in the number of business organizations, but the total land area in farms is unchanged.

Some progress is observed in the whole volume of industrial production per capita, but the process is due to departures. Most of people went to the regional center – the city of Kharkiv in search of jobs.

Table 1

*Dynamics of indices statistical parameters of social and economic development in the city of Izjum (Kharkiv region)*

Setting codes	Statistical parameters	Codes of index change for the billing period						Sum of codes
		1	2	3	4	5	6	
13	The average number of employees	-1	-1	-1	-1	-1	-1	-6
22	Population by districts	-1	-1	-1	-1	-1	-1	-6
43	The population density	-1	-1	-1	-1	-1	-1	-6
55	Secondary schools	-1	-1	-1	-1	-1	-1	-6
19	Road passenger transport	-1	-1	-1	-1	1	-1	-4
41	Urban population	1	-1	-1	-1	-1	-1	-4
56	Number of subjects EDRPOU	-1	-1	-1	-1	1	-1	-4
5	Operating costs for sold goods (works, services)	-1	-1	1	-1	-1	0	-3
17	Length of departmental public roads	-1	-1	-1	0	0	0	-3
6	Companies needs of workers to fill vacancies	-1	-1	-1	1	-1	1	-2
8	Load on one vacancy	-1	-1	-1	1	-1	1	-2
18	Passengers of road transport	1	-1	-1	-1	1	-1	-2
23	Fertility	-1	1	1	-1	-1	-1	-2
24	The number of births per 1000 population	-1	1	1	-1	-1	-1	-2
25	Mortality	-1	1	1	-1	-1	-1	-2
26	The number of deaths per 1000 population	-1	1	1	-1	-1	-1	-2
27	Natural increase	-1	1	1	-1	-1	-1	-2
28	Natural increase (decrease) per 1000 population	-1	1	1	-1	-1	-1	-2
29	Number of arrivals	-1	-1	-1	1	-1	1	-2
30	Number of arrivals per 1000 population	-1	-1	-1	1	-1	1	-2
37	Pollutants into the air from stationary sources in per capita (kg)	1	0	-1	-1	-1	0	-2
38	The presence of waste ( t.)	-1	-1	1	-1	1	-1	-2
59	The number of pensioners receiving a pension under the Pension Fund	-1	-1	1	-1	-1	1	-2
60	The number of pensioners with disabilities, who are registered in the Pension Fund	-1	1	-1	-1	-1	1	-2
3	Number of enterprises by 10 thousand people	1	-1	1	-1	-1	0	-1
35	Emissions of air pollutants from stationary sources (tons)	0	0	-1	0	0	0	-1
36	The density of the emission of pollutants into the air from stationary sources (tonnes/km <sup>2</sup> )	1	1	-1	-1	-1	0	-1
54	Secondary schools	0	0	0	-1	0	0	-1
58	Number of capital investment in the region (% of total)	0	-1	1	-1	0	0	-1
7	The number of registered citizens who are not engaged in economic activity	1	-1	1	-1	-1	1	0
12	Registered unemployment	1	-1	1	-1	1	-1	0
21	Freight road transport (million tons/km)	1	1	-1	-1	-1	1	0
33	Net migration	1	-1	-1	-1	1	1	0
34	Net migration per 1000 population	1	-1	-1	-1	1	1	0
39	Waste (t)	-1	1	1	-1	1	-1	0
40	The area, km <sup>2</sup>	0	0	0	0	0	0	0
42	The rural population, persons	0	0	0	0	0	0	0
44	The total number of villages	0	0	0	0	0	0	0
46	Number of business organizations	0	0	-1	0	0	1	0
48	Number of farmers	0	0	0	0	0	0	0
50	The total land area in farms of all categories	0	0	0	0	0	0	0
51	Agricultural land area	0	0	0	0	0	0	0
52	Kindergartens	0	0	0	0	0	0	0
57	Number of capital investment at current prices (mln. UAH)	1	-1	1	-1	-1	1	0
66	Adoption of the housing (m <sup>2</sup> of total area)	-1	-1	-1	1	1	1	0
32	Number of departures per 1000 population	1	0	1	-1	1	-1	1

Continuation of table 1

47	The number of private enterprises	0	1	0	0	1	-1	1
49	Other enterprises (cooperatives, state farms, etc.)	0	0	0	1	0	0	1
1	Volume of industrial output per capita	1	1	1	-1	-1	1	2
2	Volume of industrial products (goods and services), selling prices (excluding VAT and excise)	1	1	1	-1	-1	1	2
9	Employment of people which not engaged in economic activity	1	-1	-1	1	1	1	2
11	Number of innovation active enterprises	1	0	-1	1	0	1	2
15	Volume of services	1	1	1	-1	1	-1	2
20	Transportation of goods by road (tons)	1	1	-1	1	-1	1	2
31	Number of departures	1	1	1	-1	1	-1	2
45	The number of active farms for organizational and legal forms of economic	0	1	-1	1	1	0	2
10	Number of innovation active enterprises (percent of total industrial)	1	1	-1	1	0	1	3
4	Sales of products (works, services)	1	-1	1	1	1	1	4
61	Housing (total area)	1	1	-1	1	1	1	4
63	City housing (total area)	1	1	-1	1	1	1	4
14	The average nominal monthly salary	1	1	1	1	1	1	6
16	Volume of services to the population	1	1	1	1	1	1	6
62	Housing (including privately owned)	1	1	1	1	1	1	6
64	Urban housing (including privately owned)	1	1	1	1	1	1	6
65	Supply of housing (average per person)	1	1	1	1	1	1	6
67	Retail turnover, including restaurant management	1	1	1	1	1	1	6
<b>The amount of change in the index codes</b>		<b>7</b>	<b>1</b>	<b>-3</b>	<b>-14</b>	<b>-2</b>	<b>6</b>	<b>-5</b>

Note: The accounting periods: 1 – 2006-2007; 2 – 2007-2008; 3 – 2008-2009; 4 – 2009-2010; 5 – 2010-2011; 6 – 2011-2012.

Table 2

*Dynamics of indices statistical parameters of health care system development in Lubomilskiy district of Volyn region*

Setting codes	Statistical parameters	Codes of index change for the billing period					Sum of codes
		1	2	3	4	5	
4	Actual rural population	-1	-1	-1	0	-1	-4
2	Total population	-1	-1	-1	0	0	-3
7	Natural increase	-1	-1	1	-1	-1	-3
12	Diseases of the endocrine system, eating disorders and metabolic diseases	-1	-1	-1	-1	1	-3
15	Diseases of the eye and adnexa	-1	-1	-1	-1	1	-3
18	Diseases of the respiratory system	-1	-1	-1	-1	1	-3
22	Diseases of the genitourinary system	-1	-1	-1	-1	1	-3
70	Availability of therapists	-1	-1	1	-1	-1	-3
30	The mortality rate from certain infectious and parasitic diseases	-1	1	-1	0	-1	-2
8	The incidence of regional population	-1	-1	-1	1	1	-1
10	Neoplasm	-1	1	-1	1	-1	-1
14	Diseases of the nervous system	-1	-1	-1	1	1	-1
21	Diseases of the musculoskeletal system and connective tissue	-1	-1	-1	1	1	-1
25	Symptoms, signs and abnormal	-1	-1	-1	1	1	-1
28	The incidence of alcoholic psychosis, alcoholism, drug addiction	1	-1	-1	1	-1	-1
35	The mortality rate from diseases of the nervous system	-1	1	-1	-1	1	-1
48	Died from infectious and parasitic diseases	0	1	-1	0	-1	-1
53	Died from disease of the nervous system	-1	1	-1	-1	1	-1
82	Availability of dentists	1	-1	-1	1	-1	-1
1	Area	0	0	0	0	0	0
24	Congenital malformations, deformations and chromosomal abnormalities	1	1	-1	-1	0	0

Continuation of table 2

32	The mortality rate from diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	-1	1	0	0	0	<b>0</b>
33	The mortality rate from diseases of the endocrine system, eating disorders and metabolic diseases	1	0	0	-1	0	<b>0</b>
39	The mortality rate from diseases of the skin and subcutaneous tissue	0	0	0	0	0	<b>0</b>
40	The mortality rate from diseases of the musculoskeletal system and connective tissue	0	0	0	-1	1	<b>0</b>
42	The mortality rate during pregnancy, childbirth and the postpartum period	0	-1	1	0	0	<b>0</b>
44	The mortality rate of congenital malformations, deformations and chromosomal abnormalities	1	-1	1	0	-1	<b>0</b>
50	Deaths from diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	-1	1	0	0	0	<b>0</b>
51	Died from disease of the endocrine system, eating disorders and metabolic diseases	1	0	0	-1	0	<b>0</b>
57	Died from disease of the skin and subcutaneous tissue	0	0	0	0	0	<b>0</b>
58	Deaths from diseases of the musculoskeletal system and connective tissue	0	0	0	-1	1	<b>0</b>
60	Dead during pregnancy, childbirth and the postpartum period	0	-1	1	0	0	<b>0</b>
62	Died of congenital malformations, deformations and chromosomal abnormalities	1	-1	1	0	-1	<b>0</b>
75	Availability of ultrasound diagnosis	0	0	0	0	0	<b>0</b>
79	Availability of urologists	1	-1	0	0	0	<b>0</b>
80	Availability of endoscopist	0	0	0	0	0	<b>0</b>
94	Central district hospital	0	0	0	0	0	<b>0</b>
95	District hospital	0	0	0	0	0	<b>0</b>
96	City hospital	0	0	0	0	0	<b>0</b>
97	Maternity hospitals	0	0	0	0	0	<b>0</b>
98	Children's hospital	0	0	0	0	0	<b>0</b>
99	Asylum	0	0	0	0	0	<b>0</b>
100	Tuberculosis hospital	0	0	0	0	0	<b>0</b>
101	Dental clinic	0	0	0	0	0	<b>0</b>
102	Availability of central district hospital	0	0	0	0	0	<b>0</b>
103	Availability of district hospital	0	0	0	0	0	<b>0</b>
104	Availability of city hospital	0	0	0	0	0	<b>0</b>
105	Availability of maternity hospitals	0	0	0	0	0	<b>0</b>
106	Availability of Availability of children's hospital	0	0	0	0	0	<b>0</b>
107	Availability of asylum	0	0	0	0	0	<b>0</b>
108	Availability of tuberculosis hospital	0	0	0	0	0	<b>0</b>
109	Availability of dental clinic	0	0	0	0	0	<b>0</b>
3	Actual urban population	0	0	0	0	1	<b>1</b>
5	Natality	1	-1	-1	1	1	<b>1</b>
9	Certain infectious and parasitic diseases	1	1	-1	-1	1	<b>1</b>
13	Mental and behavioral disorders	1	1	-1	1	-1	<b>1</b>
16	Diseases of the ear and mastoid process	1	-1	-1	1	1	<b>1</b>
17	Diseases of the circulatory system	1	-1	-1	1	1	<b>1</b>
26	Injury, poisoning and certain other consequences of external causes	-1	1	-1	1	1	<b>1</b>
27	The incidence of AIDS	1	1	1	-1	-1	<b>1</b>
31	The mortality rate of tumors	1	1	-1	1	-1	<b>1</b>
34	The mortality rate of mental and behavioral disorders	1	1	0	0	-1	<b>1</b>
36	The mortality rate from diseases of the circulatory system	-1	-1	1	1	1	<b>1</b>
41	The mortality rate from diseases of the genitourinary system	0	0	1	-1	1	<b>1</b>

Continuation of table 2

45	The mortality rate from injuries, poisoning and certain other consequences of external causes of action	1	-1	1	1	-1	1
46	The mortality rate from AIDS	0	1	1	-1	0	1
49	Died of tumors	1	1	-1	1	-1	1
52	Died of mental and behavioral disorders	1	1	0	0	-1	1
54	Died of cardiovascular diseases	-1	-1	1	1	1	1
59	Died from disease of the genitourinary system	0	0	1	-1	1	1
63	Dead from injuries, poisoning and certain other consequences of external causes	1	-1	1	1	-1	1
64	Died of AIDS	0	1	1	-1	0	1
66	The number of doctors (with dental)	1	-1	1	1	-1	1
67	Availability of doctors (with dental)	1	-1	1	1	-1	1
68	The number of nursing	1	1	1	-1	-1	1
69	Availability of nursing	1	1	1	-1	-1	1
71	Availability of cardiologists	1	0	0	0	0	1
72	Availability of endocrinologists	1	-1	0	1	0	1
73	Availability of physiotherapist	1	0	0	0	0	1
74	Availability of doctors of functional diagnostics	1	0	0	-1	1	1
81	Availability of oncologists	1	0	0	0	0	1
86	Availability of ophthalmologists	1	0	0	0	0	1
87	Availability of otolaryngologist	1	0	0	0	0	1
88	Availability of phthisiology	1	0	0	0	0	1
90	Availability of psychiatrists	1	0	0	-1	1	1
91	Availability of narcologists	1	0	0	0	0	1
37	The mortality rate from diseases of the respiratory system	-1	1	1	1	0	2
43	The mortality rate of certain conditions arising in the perinatal period	-1	1	0	1	1	2
47	The mortality rate from tuberculosis	1	1	-1	0	1	2
55	Died from disease of the respiratory system	-1	1	1	1	0	2
61	Died from conditions arising in the perinatal period	-1	1	0	1	1	2
65	Died of tuberculosis	1	1	-1	0	1	2
77	Availability of anesthesiologists	1	0	1	1	-1	2
83	Availability of obstetricians and gynecologists	1	-1	1	1	0	2
85	Availability of radiologists	0	1	0	0	1	2
6	The mortality rate	-1	1	1	1	1	3
11	Diseases of the blood and blood-forming organs and certain violations involving the immune mechanism	-1	1	1	1	1	3
19	Diseases of the digestive system	1	1	1	-1	1	3
20	Diseases of the skin and subcutaneous tissue	-1	1	1	1	1	3
23	Pregnancy, childbirth and the postnatal period	1	-1	1	1	1	3
38	The mortality rate from diseases of the digestive system	1	1	1	1	-1	3
56	Died from disease of the digestive system	1	1	1	1	-1	3
84	Availability of pediatricians	1	1	-1	1	1	3
110	Availability of hospital beds	1	1	1	-1	1	3
76	Availability of surgeons	1	1	1	1	0	4
89	Availability of neurologists	1	1	0	1	1	4
29	The incidence of all forms of active tuberculosis	1	1	1	1	1	5
<b>The amount of change in the index codes</b>		<b>19</b>	<b>10</b>	<b>3</b>	<b>13</b>	<b>13</b>	<b>58</b>

Note: The accounting periods: 1 – 2007-2008; 2 – 2008-2009; 3 – 2009-2010; 4 – 2010-2011; 5 – 2011-2012.

Table 2 shows data on Lubomilskiy district, which is characterized by improving the status and conditions of health care system development. In the district is observed a decrease in the incidence of population which respectively led to a decrease of mortality rate by most classes of diseases. It should be noted a slight increase in the total number of doctors and nurses. Also is observed an increase of hospital beds, although the dy-

namics of the number and availability of health care facilities in the district has not changed.

At the beginning of the research period in the district had been observed a decrease in population, but in recent years this process has stopped. But there is a steady decrease in the rural population.

The district is characterized by negative natural growth, which is not typical for the region as a whole,

although the fertility rate in recent years began to increase.

**Conclusions.** The proposed method of research of the sociogeosystems is an effective tool for solving forecasting, optimization, monitoring and control on this process. It is a part of general trajectory modeling method. It complements the analysis of development processes by taking into account changes in each parameter expansion process. The detail analysis at the level of each parameter allows significantly increase the

threshold monitoring and consider all the features of the development process for rapid response to critical situations. At optimal spatial organization of monitoring is possible an online management of resources, which greatly improves the efficiency of sociogeosystem development. The amount of changes of the index codes of statistical parameters of sociogeosystems are representative criterion for evaluating the effectiveness of their development, as well as ranking, clustering, classification, etc.

#### References:

1. Grushka V.V. *Suspilno-geografichni osoblyvosti formuvannia geoeologichnoi sytuatsii v staropromyslovomu regioni (na prykladi Dnipropetrovskoi oblasti): avtoref. dys. na zdobuttia nauk. stupenia kand. geogr. nauk: spets. 11.00.02 «Ekonomiczna ta sotsialna geografii» / V.V. Grushka. – Kharkiv, 2014. – 20 s. [Грушка В.В. Суспільно-географічні особливості формування геоекологічної ситуації в старопромисловому регіоні (на прикладі Дніпропетровської області): автореф. дис. на здобуття канд. геогр. наук: спец. 11.00.02 «Економічна та соціальна географія» / В.В. Грушка. – Харків, 2014. – 20 с.]*
2. Niemets K.A. *Prostorovyi analiz u suspilnyi geografii: novi pidkhody, metody, modeli [monografiia] / K.A. Niemets, L.M. Niemets. – Kharkiv: Kharkivskiy natsionalnyi universytet imeni V.N. Karazina, 2013. – 228 s. [Нємець К.А. Просторовий аналіз у суспільній географії: нові підходи, методи, моделі [монографія] / К.А. Нємець, Л.М. Нємець. – Харків: Харківський національний університет імені В. Н. Каразіна, 2013. – 228 с.]*
3. Niemets K. *Modeliuvannia traiektorii rozvytku sotsiogeosystem: analiz i vizualizatsiia rezultativ / Niemets K., Niemets L. // Chasopys sotsialno-ekonomichnoi geografii: Mizhregion. zbirnyk nauk. prats. – Vyp. 15(2). – Kharkiv, KhNU imeni V.N. Karazina, 2013. – S. 7-10. [Нємець К. Моделювання траєкторії розвитку соціогеосистем: аналіз і візуалізація результатів / Нємець К., Нємець Л. // Часопис соціально-економічної географії: Міжрегіон. збірник наук. праць. – Вип. 15(2). – Харків, ХНУ імені В. Н. Каразіна, 2013. – С. 7-10]*
4. Niemets K., Pogrebskyi T., Telebeneva Y., Likhvan V. *Modeling of the developmental trajectory of regional sociogeosystems of Ukraine: analysis and visualization of the results. Uniwersytet Śląski Wydział Nauk o Ziemi Sosnowiec 2014, Acta Geographica Silesiana, 17. WNoZ UŚ, Sosnowiec, 2014 – p. 97, 33-39 p.*
5. Pogrebskyi T. *Somponent analysis of the developmental vector of health care system in the districts sociogeosystems of Volyn region // Chasopys sotsialno-ekonomichnoi geografii: Mizhregion. zbirnyk nauk. prats. – Kharkiv: KhNU imeni V.N. Karazina, 2014. – Vyp. 17(2). – S. 212-218. [Pogrebskyi T. Component analysis of the developmental vector of health care system in the districts sociogeosystems of Volyn region. Часопис соціально-економічної географії: Міжрегіональний збірник наукових праць. – Харків: ХНУ імені Каразіна, 2014. – Вип. 17(2). – С. 212-218]*
6. Yakovleva Yu.K. *Sotsialnyi rozvytok Donetskoi oblasti: suspilno-geografichniy aspekt: monografiia / [pid nauk. red. L.M. Niemets]. – Kh.: KhNU imeni V.N. Karazina, 2014. – 416 s. [Яковлева Ю.К. Соціальний розвиток Донецької області: суспільно-географічний аспект: монографія / [під наук. ред. Л.М. Нємець]. – Х.: ХНУ імені В.Н. Каразіна, 2014. – 416 с.]*

#### Summary

#### Ievgeniia Telebienieva, Taras Pogrebskyi. COMPONENT ANALYSIS OF THE DEVELOPMENTAL VECTOR OF URBAN AND DISTRICT SOCIOGEOSYSTEMS (ON EXAMPLE OF KHARKIV AND VOLYN REGIONS OF UKRAINE).

With the development of the methodology of scientific research increases the degree of abstraction methods and techniques of knowledge. Today is particularly noticeable methodological evolution of science that have not yet reached a high level of formalization of the conceptual apparatus and so new, not even a very big step in this direction give very reliable results. This article deals with methodological questions about using component analysis to analyze the socio-economic development and the health care system development of urban and district sociogeosystems. It is proposed together with a common vector analysis to explore its projection on the axis of space – for the time-derivative of each process parameter in set of changes that makes it possible to study the development of sociogeosystem at the level of each parameter. This makes it possible to move from an overall assessment of social and economic development and health care system development in the integral form to the assessment for individual components (parameters), which makes sense, for example, in the tasks of planning, forecasting and optimization of development. Specific recommendations for improving of social and economic development and health care system development can be obtained by analyzing the change in the index of statistical parameters of a specific sociogeosystems. The detail analysis at the level of each parameter allows significantly increase the threshold monitoring and consider all the features of the development process for rapid response to critical situations.

**Key words:** social and economic development, health care system, urban sociogeosystem, district sociogeosystem, developmental vector, time-derivative of parameters.