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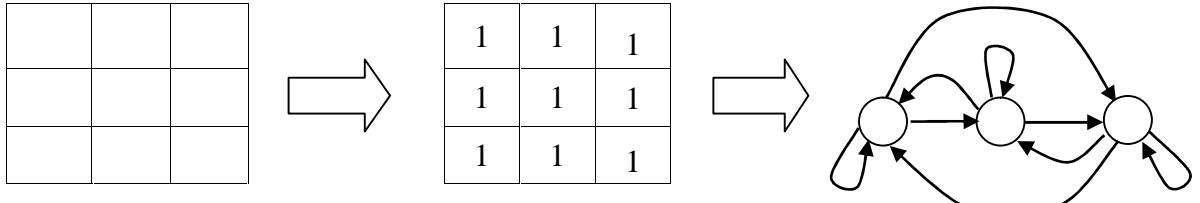
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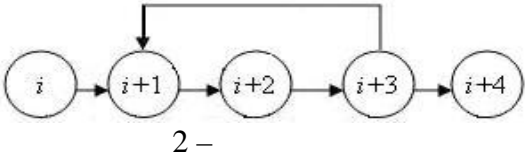
$$[ij]_A = [i, j],$$

$$S_i \quad S_j \quad ij=1$$

$$ij=0,$$

$$2, 3 \dots, n, \quad ij \ n-$$

$S$   
 $i-$   
 $i-$



( . 2)

$$C = \begin{pmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}; \quad C^2 = \begin{pmatrix} 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}; \quad C^3 = \begin{pmatrix} 0 & 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{pmatrix}.$$

**R**

$C^n, n = 1, 2$

..., m, m —

**R<sup>2</sup>**

0	1	1	0	0
0	0	1	1	0
0	1	0	1	1
0	1	1	0	1
0	0	0	0	0

**R<sup>3</sup>**

0	1	1	1	0
0	1	1	1	1
0	1	1	1	1
0	1	1	1	1
0	1	1	1	1
0	0	0	0	0

**R<sup>4</sup>**

0	1	1	1	1
0	1	1	1	1
0	1	1	1	1
0	1	1	1	1
0	1	1	1	1
0	0	0	0	0

$$r_{ij} = \begin{cases} 1, & (c_{ij}^{n-1} = 1) \vee (c_{ij}^n = 1) \\ 0, & (c_{ij}^{n-1} = 0) \wedge (c_{ij}^n = 0) \end{cases}.$$

**R<sup>n</sup>**

*i*

*j n* ( . 3).

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**R<sup>3</sup>** (4×4)

$$R \Rightarrow R^T$$

$$W = R \cap R^T$$

$$w_{ij} = \begin{cases} 1, & (r_{ij} = 1) \wedge (r_{ij}^T = 1); \\ 0, & (r_{ij} = 0) \vee (r_{ij}^T = 0). \end{cases}$$

**W**

( ) ,

**W<sup>n</sup>**,

NCB ver. 3.1 ( . 1).

$$W^2 = R^2 \cap (R^2)^T ( . 3).$$

2.1 2.2

**W<sup>2</sup>**

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	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12	2.13	2.14	2.15
2.1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	1
2.2	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
2.3	0	1	0	1	0	0	0	0	0	0	0	0	1	0	1
2.4	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1
2.5	0	0	1	0	0	0	0	0	0	0	0	1	0	1	1
2.6	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
2.7	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
2.8	1	1	0	1	0	0	1	0	1	0	0	0	1	0	0
2.9	0	0	1	0	1	0	0	1	0	1	0	0	0	0	0
2.10	0	0	0	0	0	0	1	1	1	0	0	0	0	1	0
2.11	1	0	1	1	0	1	0	0	1	1	0	0	0	1	0
2.12	1	0	0	0	0	1	0	0	0	1	1	0	0	1	1
2.13	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1
2.14	0	1	0	1	0	1	0	0	0	0	0	0	1	0	1
2.15	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0

$$W^2 = R^2 \cap (R^2)^T$$

: 2.6 – 2.7; 2.8 ... 2.10 2.14 – 2.15.

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$$W^2 = R^2 \cap (R^2)^T$$

2.12

2.12

2.6 2.7.

2.7,

$$W^3 = R^3 \cap (R^3)^T$$

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( . 3– ).

		До компетенції														
		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12	2.13	2.14	2.15
2.1	Від компетенції	1	1	0	1	1	0	0	1	1	1	1	1	1	1	1
2.2		1	1	1	1	1	0	0	1	0	0	0	1	0	1	1
2.3		0	1	0	0	1	0	0	1	0	0	0	0	0	0	0
2.4		1	1	0	1	1	0	0	1	1	0	0	0	1	1	1
2.5		1	1	1	1	0	1	0	0	0	1	1	1	1	1	1
2.6		0	0	0	0	1	1	1	0	0	0	0	1	0	1	1
2.7		0	0	0	0	0	1	1	0	0	0	0	1	0	1	0
2.8		1	1	1	1	0	0	0	1	1	1	0	1	1	0	0
2.9		1	0	0	1	0	0	0	1	1	1	0	1	0	0	0
2.10		1	0	0	0	1	0	0	1	1	1	0	0	0	0	0
2.11		1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
2.12		1	1	0	0	1	1	1	1	0	1	1	0	0	0	0
2.13		1	0	0	1	1	0	0	1	0	0	0	0	0	1	1
2.14		1	1	0	1	1	1	1	0	0	0	0	0	1	1	1
2.15		1	1	0	1	1	1	0	0	0	0	0	0	1	1	1

		До компетенції														
		2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12	2.13	2.14	2.15
2.1	Від компетенції	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.2		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.3		1	1	1	1	1	1	1	1	1	1	0	0	1	1	1
2.4		1	1	1	1	1	1	1	1	1	1	1	0	1	1	1
2.5		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.6		1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
2.7		1	1	1	1	1	1	1	1	0	0	1	1	1	1	1
2.8		1	1	1	1	1	0	0	1	1	1	1	1	1	1	1
2.9		1	1	1	1	1	0	0	1	1	1	1	1	1	1	0
2.10		1	1	0	1	1	1	1	1	1	1		1	0	0	0
2.11		1	1	0	0	1	1	1	1	1		1	1	0	0	0
2.12		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2.13		1	1	1	1	1	1	1	1	1	0	0	1	1	1	1
2.14		1	1	1	1	1	1	1	1	1	0	0	1	1	1	1
2.15		1	1	1	1	1	1	1	1	0	0	0	1	1	1	1

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$$W^2 = R^2 \cap (R^2)^T$$

$$W^3 = R^3 \cap (R^3)^T$$

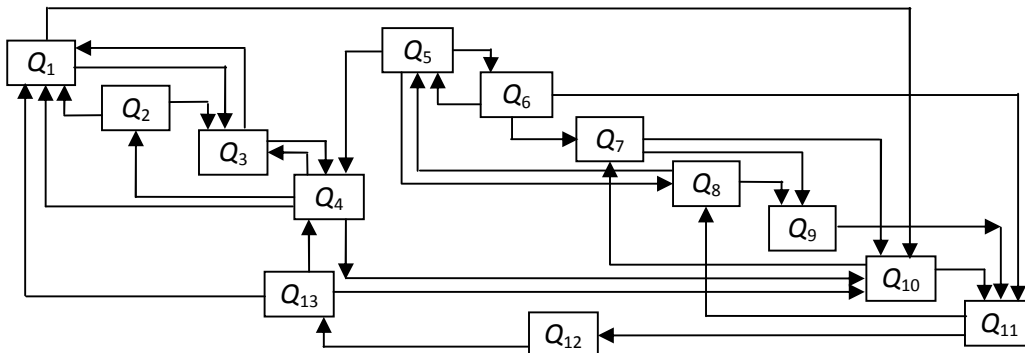
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NCB ver. 3.1

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$$W^2 = R^2 \cap (R^2)^T,$$

4 ( . 5).

$$W^3 = R^3 \cap (R^3)^T,$$

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До ядра знань

	1	2	3	4	5	6	7	8	9	10	11	12	13
1			1									1	
2	1		1										
3	1			1									
4	1	1	1								1		
5					1								
6					1	1					1		
7							1	1					
8					1			1					
9												1	
10							1			1			
11								1				1	
12													1
13	1		1							1			

5 -

До ядра знань

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	1	1	1	1	0	0	1	0	0	1	1	1	1
2	1	0	1	1	0	0	0	0	0	1	0	0	1
3	1	1	1	1	0	0	0	0	0	1	0	0	1
4	1	1	1	1	0	0	1	0	0	1	1	1	1
5	0	0	0	0	1	1	1	1	1	0	0	1	0
6	0	0	0	0	1	1	1	1	1	1	1	1	0
7	1	0	0	1	1	1	1	0	1	1	1	0	1
8	0	0	0	0	1	1	0	0	1	1	1	0	0
9	0	0	0	0	0	1	1	1	0	1	1	1	0
10	1	1	1	1	0	1	1	1	1	1	1	1	1
11	1	0	0	1	1	1	1	1	1	0	1	1	1
12	1	0	0	1	0	1	0	0	1	1	1	0	1
13	1	1	1	1	0	0	1	0	0	1	1	1	0

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$$W^2 = R^2 \cap (R^2)^T$$

$$W^3 = R^3 \cap (R^3)^T$$

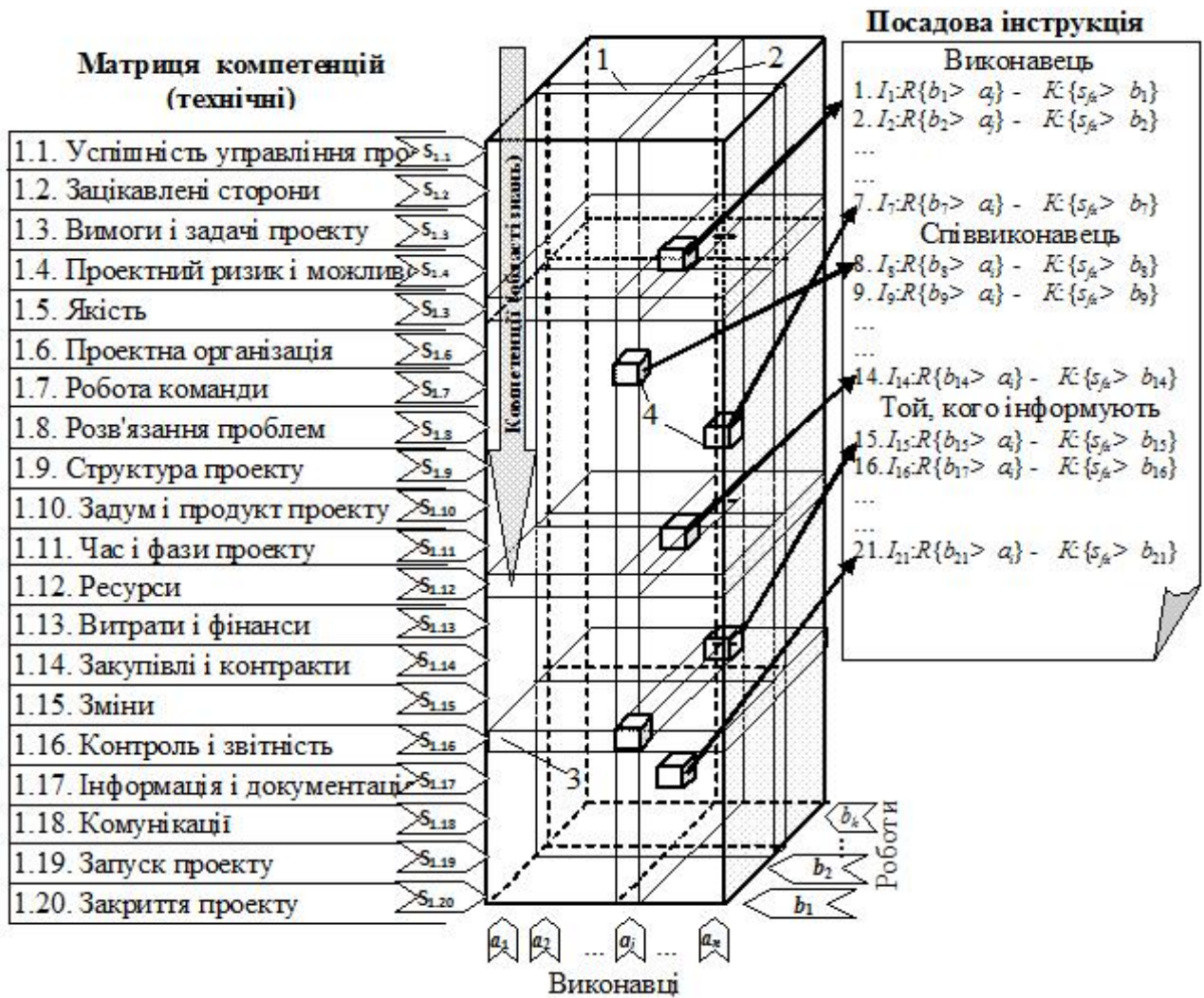
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): 1, 2, 3 -

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1, 2, ..., k)

$a_i$  ( $i = 1, 2, \dots, n$ ).

$b_j$  ( $j = 1, 2, \dots, k$ )

$b_j$  ( $j =$

$f=2; v=1, 2, \dots, 11$      $f=3$ :     $s_{fv} (f=1, 2, 3; v=1, 2, \dots, 20 \quad f=1; v=1, 2, \dots, 15$   
 $I_j -$  ,     $I_j: R\{b_j \quad a_j\}$      $K: \{s_{fv} \quad b_j\}, j=1, 2, \dots, k,$   
 $K -$  ;     $R$  ,  $j=1, 2, \dots, k;$

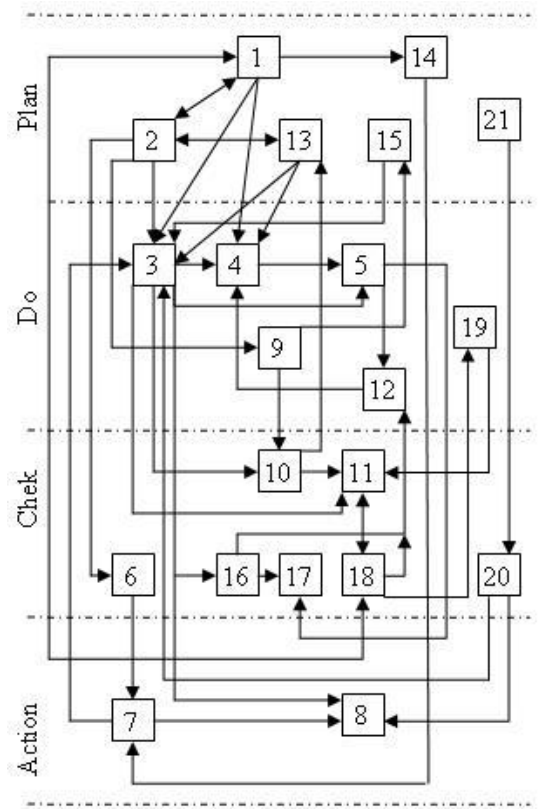
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7 -

( k)

{p<sub>1</sub>(k), p<sub>2</sub>(k), ... p<sub>m</sub>(k)}

(k + 1)

$$\begin{pmatrix} p_1(k+1) \\ p_2(k+1) \\ \vdots \\ p_{20}(k+1) \\ p_{21}(k+1) \end{pmatrix}^T = \begin{pmatrix} p_1(k) \\ p_2(k) \\ \vdots \\ p_{20}(k) \\ p_{21}(k) \end{pmatrix}^T \begin{pmatrix} 1.1 & 1.2 & \cdot & \cdot & \cdot & 1.20 & 1.21 \\ 2.1 & 2.2 & \cdot & \cdot & \cdot & 2.20 & 2.21 \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot & \cdot & \cdot \\ 20.1 & 20.2 & \cdot & \cdot & \cdot & 20.20 & 20.21 \\ 21.1 & 21.2 & \cdot & \cdot & \cdot & 21.20 & 21.21 \end{pmatrix}$$

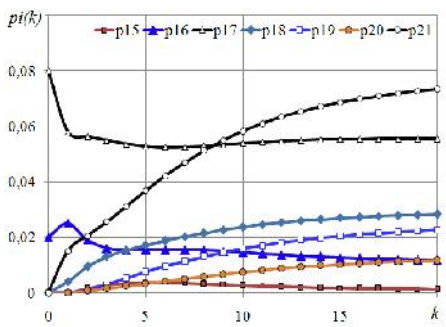
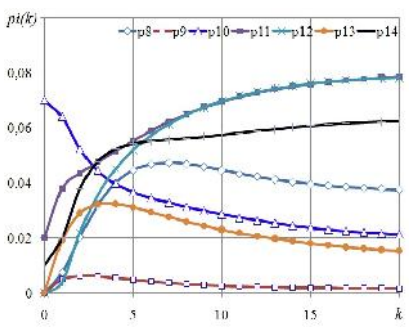
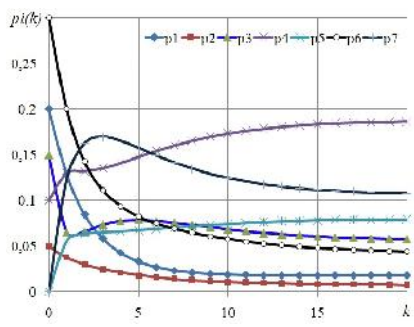
$$p_i(k) - : \sum_{i=1}^m p_i(k) = 1; \sum_{j=1}^m f_{ij} = 1, \quad \{i = 1, 2, \dots, 21\}.$$

( . 8 - ); 8 - 14 : ( . 8 - ), 15 - 21, ( . 8 - ).

( . 8)

p4(30) = 0,19 -  
 : p7(30) = 0,105 -  
 ; p5(30) = 0,08 -  
 : p3(30) = 0,06; p6(30) = 0,04; p1(30) = 0,02; p2(30) =

0,007 -



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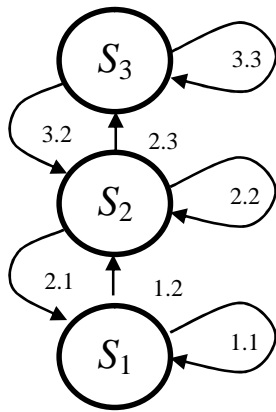
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S3 - ( . 10).

S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub> k-



$p_i(k)$  -  
 $ij$  -

$$\begin{pmatrix} p_1(k+1) \\ p_2(k+1) \\ p_3(k+1) \end{pmatrix} = \begin{pmatrix} p_1(k) \\ p_2(k) \\ p_3(k) \end{pmatrix} \cdot \begin{pmatrix} 1.1 & 1.2 & 0 \\ 2.1 & 2.2 & 2.3 \\ 0 & 3.2 & 3.2 \end{pmatrix}$$

,  $i = 1, 2, 3$ ;  
,  $i, j = 1, 2, 3$ ;

$$\|_{ij}\|_1 = \begin{pmatrix} 0,9 & 0,1 & 0 \\ 0,1 & 0,89 & 0,01 \\ 0 & 0,01 & 0,99 \end{pmatrix}$$

$$\|_{ij}\|_2 = \begin{pmatrix} 0,2 & 0,8 & 0 \\ 0,1 & 0,29 & 0,61 \\ 0 & 0,1 & 0,90 \end{pmatrix}$$

$\|_{ij}\|_1$  -

$\|_{ij}\|_2$  -

. 11.

$\|_{ij}\|_1$

. 11- .



$u_i + r_i = 1,$   
 $u_i - r_i = q_{ik},$   
 $q_{ik} < 0,7,$   
 $q_{ik} = 1,$   
 $0 < q_{ik} < 1,$   
 $r_i = 1 - q_{ik}.$

$$\begin{cases} q_{i(\Sigma k)} = 1 - \prod_{k=1}^n (1 - q_{ik}), \\ r_{i(\Sigma k)} = 1 - q_{i(\Sigma k)}, \end{cases}$$

$$\begin{cases} q_{i(\Sigma k)}|_{n+1} > q_{i(\Sigma k)}|_n \\ r_{i(\Sigma k)}|_{n+1} < r_{i(\Sigma k)}|_n \end{cases}$$

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### ANNOTATION

**Lukianov D.V. Models and methods of knowledge management in projects on the basis of the competence approach. – The manuscript.**

The dissertation for obtaining the scientific degree of Candidate of technical sciences in specialty 05.13.22 – Project and Program Management. – Odessa national polytechnic university MESU, Odessa, 2014.

In the thesis tasks formalization of knowledge management in projects was performed and the criteria for evaluating of the effectiveness of competence performers was determine, the mathematical description of the requirements of national standard (NCB) to the competencies of project managers was evaluated; the method of analysis of competencies' complex to form cores of technical, personal and contextual competencies was evaluated; the model of the levels of competence requirements based on needs for projects in organizations was founded; industrial tests were carried out and the estimation of effectiveness of the implementation of the work was done.

*The object of study* is knowledge management in projects

*The subject of study* – models and methods of knowledge management in projects on the basis of the competence approach.

**Keywords:** project management, knowledge management, Markov chain, competencies, certification, core of knowledge, organizational knowledge, graph theory, system analysis, job description, Johari window.

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