

**ПАРАЛЕЛЬНІ АЛГОРИТМИ
РОЗВ'ЯЗАННЯ ЗАДАЧ БУЛЕВОГО
КВАДРАТИЧНОГО ПРОГРАМУВАННЯ**

()

(UBQP) :

$$\max \left\{ f(x) = \sum_{i=1}^n \sum_{j=1}^n q_{ij} x_i x_j \mid x \in B^n \right\}, \quad (1)$$

q_{ij} –

Q n , B^n – 0 1 .

(1)

(WMAXCUT). (MAXCLIQUE)

$$\max \left\{ f(x) = \sum_{(i,j) \in E} w_{ij} (x_i - x_j)^2 \mid x \in B^n \right\},$$

$$w_{ij} \geq 0, \quad (i, j) \in E.$$

(GES) [1, 2]

UBQP [3, 4],

GES

UBQP (1) WMAXCUT

GES.

GES

WMAXCUT UBQP [5 – 8].

$$A = \{A_1, \dots, A_n\},$$

$$P$$

$$A,$$

$$portfolio\{n_1 A_1, \dots, n_m A_m\} \quad P$$

$$P = \sum_{i=1}^m n_i A_i$$

$$n_i, i = 1, \dots, m,$$

$$team\{n_1 A_1, \dots, n_m A_m\},$$

$$unit,$$

$$t_{unit} = \min_{j=1, \dots, P} t_j, \quad t_j \geq 0,$$

j-

UBQP.

(1) UBQP « ».

« » (1).

GES, [4],

GESPR [6].

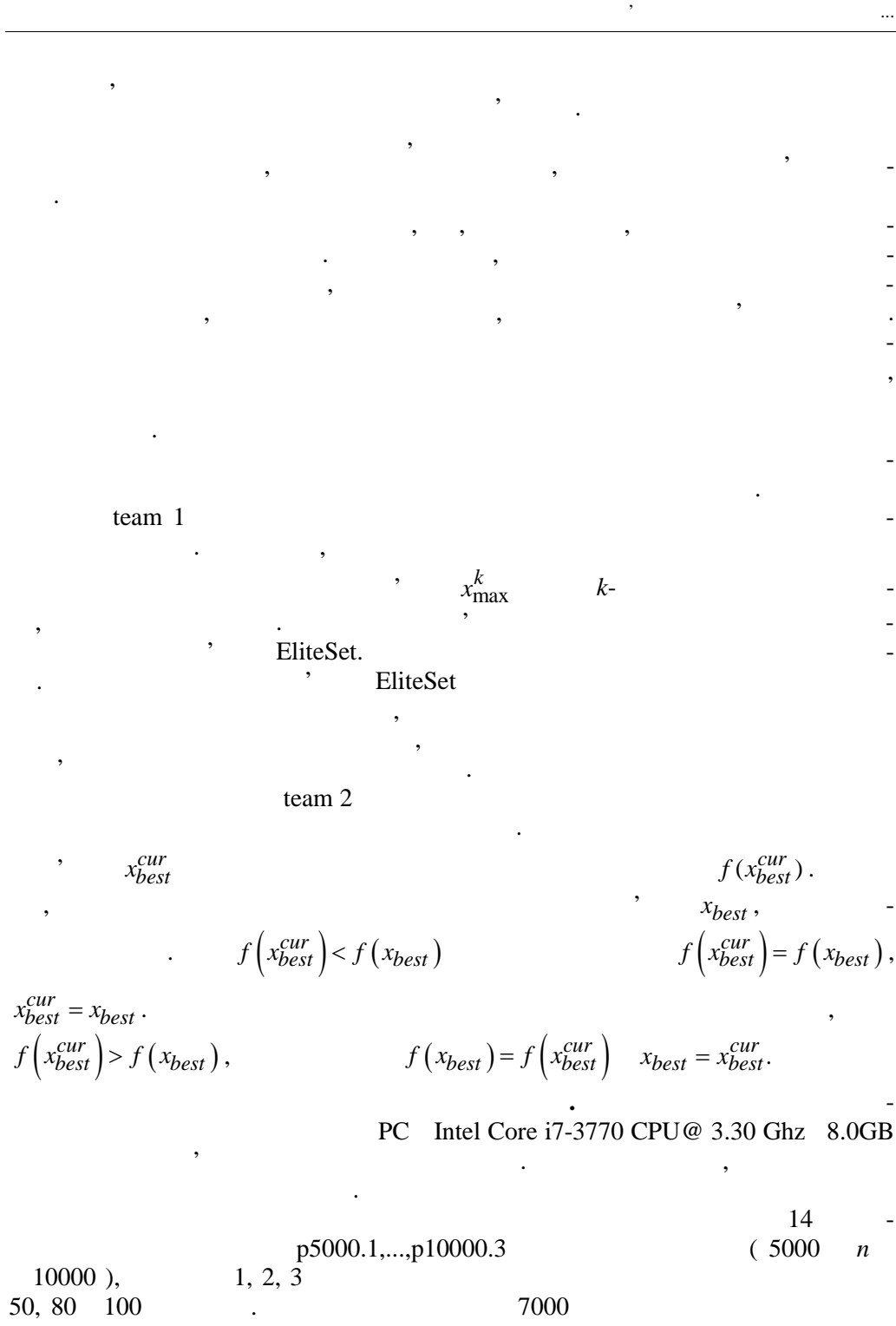
GESPR

[9] UBQP UBQP.

MAXCUT G1–G54 [10]

MAXCUT

G55 – G80 [10]



[9] $n = 10000$.

http://www.proin.ktu.lt/~gintaras/ubqop_its.html.

6000, 7000, 10000 $n = 5000$
port4 team4

[4].
9
GES,

$$x^{\max}(i) \quad t^{\max}(i) -$$

$$i- , i = 1, \dots, 20, \quad ; f(x^{BKS}) -$$

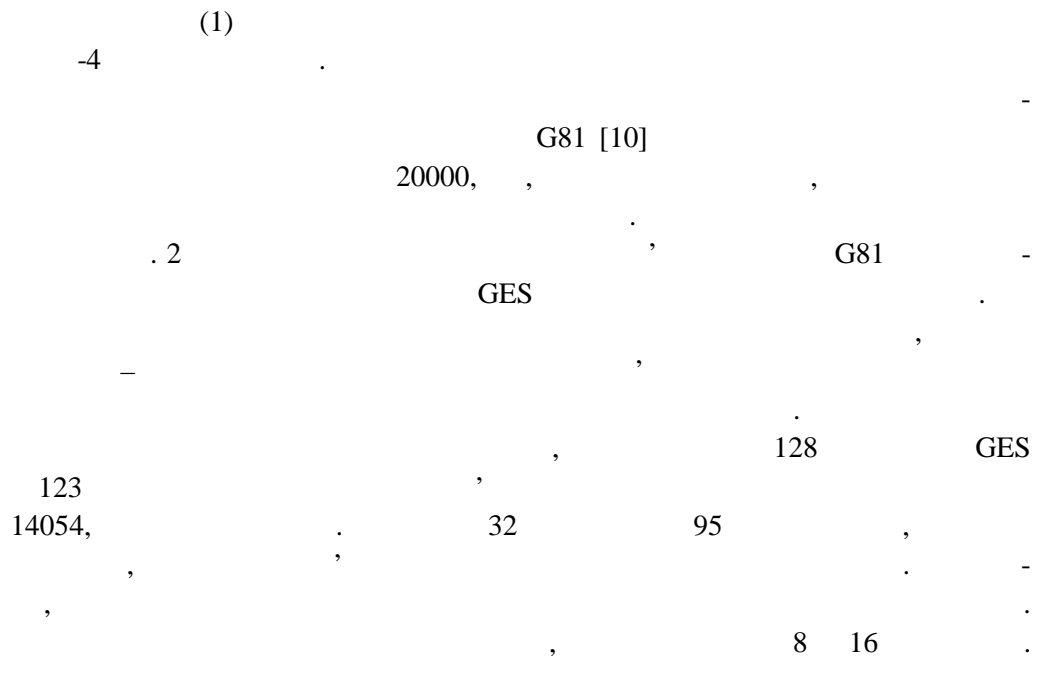
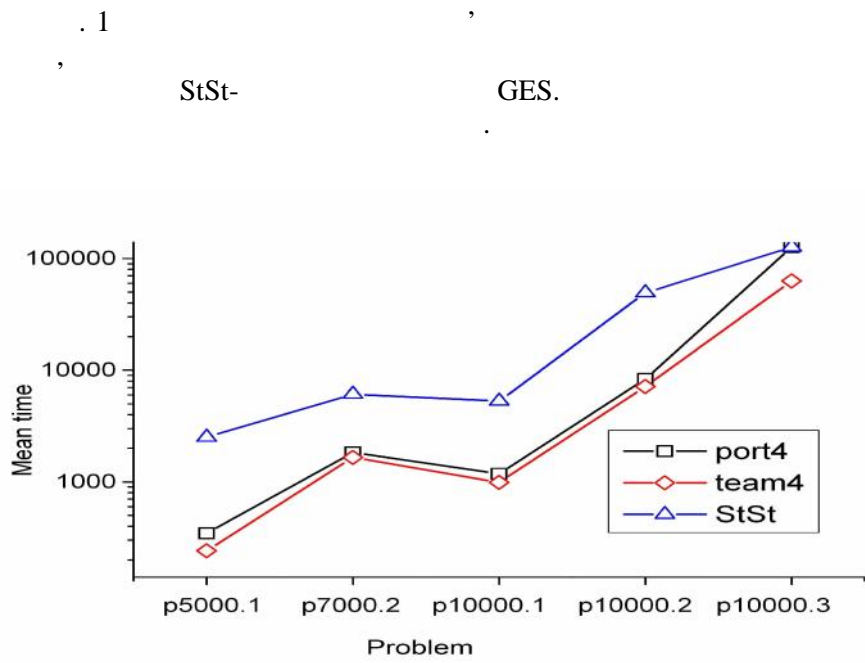
$$g_{avr} = f(x^{BKS}) - \frac{1}{20} \sum_{i=1}^{20} f(x^{\max}(i)); \quad t_{avr} = \frac{1}{20} \sum_{i=1}^{20} t^{\max}(i);$$

$$t_{avr-rec} = \frac{1}{20} \sum_{i=1}^{20} \left\{ t^{\max}(i) \mid f(x^{\max}(i)) \geq f(x^{BKS}) \right\};$$

$$success = |I^{\max}| -$$

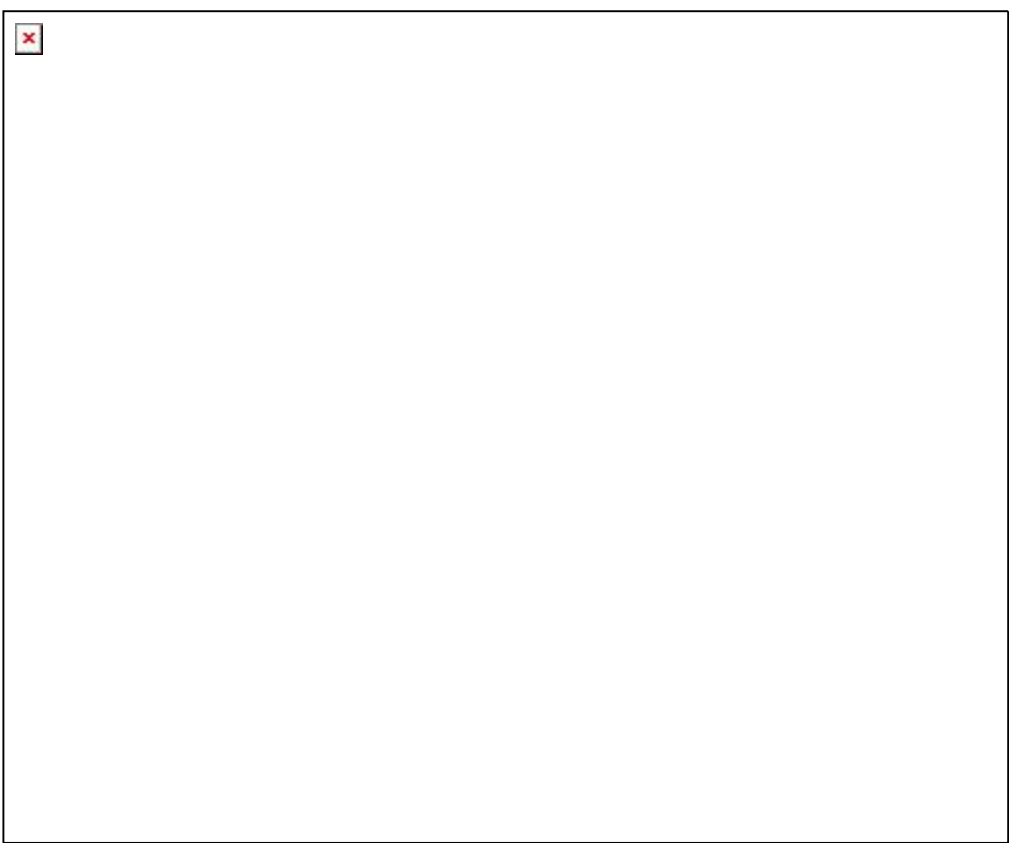
$$f(x^{BKS}), \quad I^{\max} = \left\{ i \mid f(x^{\max}(i)) \geq f(x^{BKS}) \right\}.$$

	success			g_{avr}			t_{avr}			$t_{avr-rec}$		
	port4	team4	GES	port4	team4	GES	port4	team4	GES	port4	team4	GES
p5000.1	19	20	8	16,25	0,00	195,0	266,63	241,2	411,1	276,5	241,2	525,9
p7000.2	17	19	9	15,6	5,2	127,7	1359,6	1476,4	1969,9	1272,1	1486,2	2229,2
p10000.1	20	20	11	0,0	0,0	794,3	1180	989,2	1901,1	1180	989,2	2217,8
p10000.2	9	11	2	406,4	348,7	839,5	2375,9	2519,6	2485,1	1935,3	2841,4	1949,9
p10000.3	1	2	1	1796,2	1693,3	2224,4	2711,7	2961,5	2283,5	6064,4	6142,7	6102,9
	13,2	14,4	6,2	446,9	409,4	836,2	1578,8	1637,6	1810,2	2145,7	2340,1	2605,1

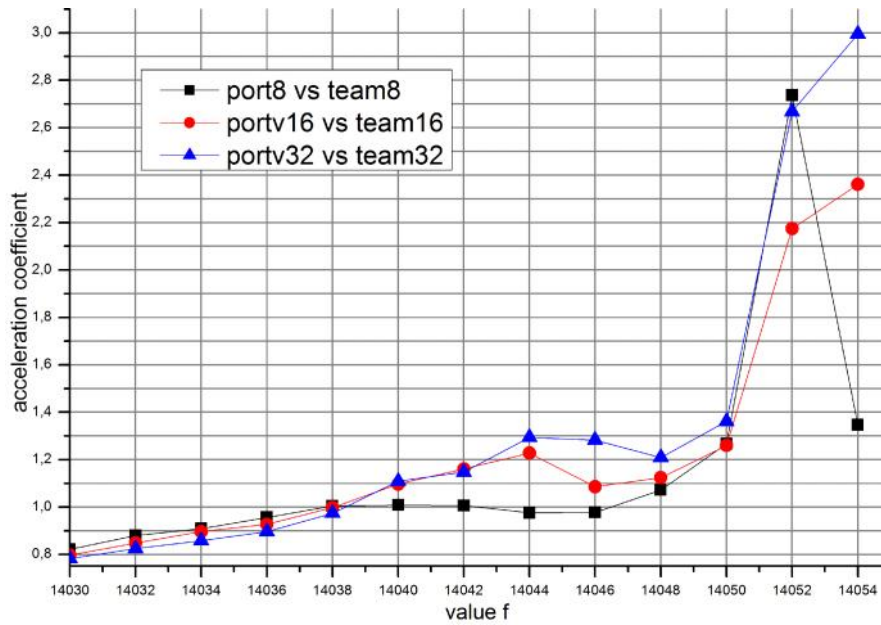


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32 ,
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.2. , G81
GES G81
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. 3.

GES

(GES)

GES

V.P. Shylo, V.O. Roschyn, P.V. Shylo

PARALLEL ALGORITHMS FOR SOLVING THE BOOLEAN QUADRATIC PROGRAMMING PROBLEM

Approaches to building portfolios and teams of global equilibrium search (GES) algorithms for parallel solving unconstrained Boolean quadratic programming problems are proposed. They are based on the main structure types of local optimums of these problems. The results of the computational experiments on solving large-scale problems confirm the effectiveness of constructed portfolio, teams of GES algorithms, and the appropriate software.

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21.10.2015

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