



TWMS 2017

VI CONGRESS OF THE TURKIC WORLD MATHEMATICAL SOCIETY
October 2–5, 2017 Astana – Kazakhstan

TURKIC WORLD MATHEMATICAL SOCIETY
MINISTRY OF EDUCATION AND SCIENCE
OF THE REPUBLIC OF KAZAKHSTAN
L.N. GUMILYOV EURASIAN NATIONAL UNIVERSITY

**ТҮРКІТІЛДЕС ЕЛДЕР
МАТЕМАТИКАЛЫҚ ҚОҒАМЫ
VI КОНГРЕСІНІҢ ТЕЗИСТЕР ЖИНАҒЫ**

**ABSTRACTS
OF VI CONGRESS OF THE
TURKIC WORLD MATHEMATICAL SOCIETY**

**СБОРНИК ТЕЗИСОВ VI КОНГРЕССА
МАТЕМАТИЧЕСКОГО ОБЩЕСТВА
ТЮРКОЯЗЫЧНЫХ СТРАН**



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PARALLEL TECHNOLOGIES FOR SOLVING PROBLEMS IN THE FIELD OF PETROLEUM GEOPHYSICS

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At present, parallel technologies are used to solve problems associated with "big data". One of the such problem is the problems in the field of petroleum geophysics. To model the problem of oil production, it is necessary a large amount of computational time and resource. To obtain the good speedup, various parallel technologies are used, for example, CUDA, MPI, OpenMP, hybrid computing, computation on Intel's Xeon Phi and etc.

We have investigated a various of parallel technologies to solve problems in the field of petroleum geophysics. Parallel algorithms with MPI were studied to solve oil recovery problems [1]. Three-phase fluid flow numerical model was solved using the technology of fragmented programming of the LuNA system [2]. And high-performance computing have been implemented for EOR problem on mobile devices with Nvidia Tegra K1 processor [3]. The results of testing were obtained and compared with similar works. On the basis of investigations it may be stated that increase in computing resources is not enough to get a good speedup, the main thing is to use an efficient algorithm using various of parallel technologies.

Funding: The authors were supported by the grant no. 3294/GF4 of the Ministry of Education and Science of Republic of Kazakhstan.

Keywords: heterogeneous computing, CUDA, MPI, parallel technology, EOR problem

2010 Mathematics Subject Classification: 35Q79, 35K05, 35K20

REFERENCES

- [1] T.S.Imankulov, D.Zh.Akhmed-Zaki, B.S.Daribayev, O.N.Turar HPC Mobile Platform for Solving Oil Recovery Problem, 13th International Conference on Informatics in Control, Automation and Robotics (ICINCO), (2016), 595–598.
- [2] Akhmed-Zaki D., Perepelkin V. A., Lebedev D.V. Implementation of a three dimensional three-phase fluid flow numerical model in LuNA fragmented programming system, The Journal of Supercomputing, 73:2 (2017), 624–630.
- [3] Akhmed-Zaki D.Zh., Daribayev B.S., Imankulov T.S., Turar O.N. High-performance computing of oil recovery problem on a mobile platform using CUDA technology, Eurasian Journal of mathematical and computer applications, 5:2 (2017), 4–13.

EXPLICIT

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REFERENCES

- [1] Danaev N., Modelling of Oil Recovery Problem, Journal of Supercomputing, 73:2 (2017), 624–630.