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Organization of High-performance Computing on the Mobile Platforms to Calculate the Oil Recovery of Reservoir

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SUMMARY

Recently variety of novel parallelization technologies and approaches is rapidly developing. Distribution of high-powered graphical processors and parallelization tools on mobile platforms required a detailed comparison of computational capabilities on practical problems. This paper considers numerical investigation of oil displacement process by polymer/surfactant flooding taking into account water salinity and temperature effects, study parallel algorithms for it on several platforms and describes the organization of high-performance computing by using GPU of mobile devices. Calculation times, efficiency and speed up of these algorithms on various platforms were compared in order to identify optimal technology or combination of technologies for effective and well-optimized developments of industrial scale simulator. Basic parallelization technologies being used: MPI and CUDA. The calculations are performed on a mobile devices Xiaomi MiPad with NVIDIA Tegra K1 and on a personal computers with NVIDIA GeForce and Tesla K20. Besides the comparison of different version's working time profound analysis of different platforms' using expedience presented considering of the received working time benefits. Standard and proven parallelization tools are being used by way of samples for justification competitiveness of new types of parallelization. The research output has led the authors to come to the main conclusion: mobile devices can be used as computers to solve problems in oil industry.