

The goal of this Thesis was to evaluate a possibility to solve systems of linear algebraic equations with the help of graphical processing units (GPUs). While such solvers for generally dense systems seem to be more or less a part of standard production libraries, the Thesis concentrates on this low-level parallelization of equations with a sparse system that still presents a challenge. In particular, the Thesis considers a specific algorithm of an approximate inverse decomposition of symmetric and positive definite systems combined with the conjugate gradient method. An important part of this work is an innovative parallel implementation. The presented experimental results for systems of various sizes and sparsity structures point out that the approach is rather promising and should be further developed. Summarizing our results, efficient preconditioning of sparse systems by approximate inverses on GPUs seems to be worth of consideration.