

The diploma theses is focused on matrix-free preconditioning of a linear system. It gives a very brief introduction into the area of iterative methods, preconditioning and matrix-free environment. The emphasis is put on a detailed description of a variant of LU factorization which can be computed in a matrix-free manner and on a new technique connected with this factorization for preconditioning by incomplete LU factors in matrix-free environment. Its main features are storage of only one of the two incomplete factors and low memory costs during the computation of the stored factor. The thesis closes with numerical experiments demonstrating the efficiency of the proposed technique.