

In this thesis we introduce selected classes of matrices, whose entries are only numbers -1 , 1 , 0 . We combine existing results from various fields of Mathematics and enrich them with specific examples and explanations, with the aim of making the understanding of the text easier. Thanks to that, the reader can comprehend the theory and look under the hood of non-trivial applications. We will start with introducing adjacency matrices and covering of complete graphs with complete bipartite graphs. Then we follow with Hadamard matrices and will show the conditions for their constructions. Incidence matrices of the set systems will help us solve the combinatorial problem of the Odd-town clubs. Finally, we will prove the Cayley formula about the spanning trees of the complete graph, using incidence matrices.