

Abstract: In its theoretical part, this thesis sums up the basic knowledge concerning permutations. Besides the representation of permutations and determination of their fundamental characteristics, the theoretical part is, first of all, aimed at results concerning the decomposition of permutations into disjoint cycles and at finding the number of permutations with a certain characteristic. We introduce the fundamental bijection that is useful for solving many problems concerning the permutations. Further on, we focus on the number of permutations without a fixed point, Eulerian numbers expressing the number of permutations with a given number of descents, and the number of permutations with a given number of excedances, Stirling numbers of the first kind expressing the number of permutations with a given number of cycles, and Catalan numbers representing the number of permutations avoiding a chosen pattern of length three. Attention is also paid to the Gilbreath permutations and their characteristics. The practical part consists of 14 solved problems. The solutions rely on the results presented in the theoretical part, and there are deduced some further interesting results concerning random permutations.