

Abstract: This thesis is focused on the analysis of residual correlations between deviations of nuclear masses from Garvey-Kelson relations, which are local algebraic relations connecting masses of neighbouring nuclei. Properties of the correlation matrix determined by the deviations from Garvey-Kelson relations and by the calculated spectral correlations are consistent with the hypothesis formulated beforehand, that it is possible to understand the deviations as statistically independent fluctuations in a good agreement. Therefore, the masses of nuclei cannot be described by a global function of the number of protons and neutrons with an accuracy greater than the size of the deviations, i.e. with an accuracy better than an order of 100 keV. Principal component analysis shows that the largest residual correlations are located (i) in the area of magic numbers and (ii) between strongly deformed heavy nuclei.