Programs for the R-Matrix Description of Neutron Cross-Section Structure

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Abstract

A study of neutron fission and non-fission cross sections, performed during many years in the Frank Laboratory of Neutron Physics, allowed to accumulate a significant experience in the analysis of resonance structure of the cross section as well as of correlation effects in fission using R-matrix formalism. We present a detailed description of the mathematical approach used for the analysis of experimental data with the help of least square method (FUMILI minimization) in order to extract the parameters of structure of cross section or correlation coefficients. The obtained results of the fits for the total, fission and capture cross sections of ^{235}U, in the energy range up to 10 eV, and for the total cross section of ^{181}Ta, in the energy range up to 50 eV, are presented.

The calculations were performed in Fortran-codes at JINR using the FLNP and LIT computer clusters.