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PULSE HEIGHT SPECTRA UNFOLDING BY ITER CODE

ABSTRACT - The ITER code was primarily developed for the unfolding of nuclear reactor neutron spectra. It was found that this code can also be applied to pulse height spectra from different spectrometers such as scintillation detectors, proportional counters and others. A typical unfolding problem will involve 50 to 200 energy groups and 100 to 500 bin values (pulse height spectrum). Methods based on the least squares principle lead to the inversion of large matrices which tend to be ill-conditioned in cases where the response of the spectrometer does not change sharply with particle energy. It will be shown that the simple iterative procedure of the ITER code is able to handle such problems. The basic algorithm avoids subtraction as well as division with small numbers. It can be therefore operated even by an on-line minicomputer system as a background job during data acquisition. The input of the code requires measured bin values and their errors, the spectrometer response matrix including eventual cross and a first approximation of the solution which is used to initiate the iteration. A smooth function should be used for the first approximation and in most cases a constant can be substituted. The abilities of the code are illustrated on a Po-Be neutron spectrum measured by a single crystal scintillation spectrometer and a gamma ray spectrum measured by a NaI(Tl) spectrometer.