Development of a novel data analysis procedure for half-life measurements

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The precise determination of nuclear parameters for nuclides with a long half-life is of extreme relevance, as these nuclides are often used as standard radiation sources for calibration of detector systems, for instance. On the other hand, the determination of a precise value for the half-life of ling-lived nuclei can be difficult, as it may require that the activity of a single radioactive source be followed for a long period of several months or even years.
In a previous paper, the decay of 57Co and ^{60}Co was studied using daily detector verification data from the Neutron Activation Analysis Lab of IPEN-CNEN/SP. In this analysis, the presence of many outliers in the datasets proved to be a big issue, so a robust data fitting procedure was developed.
The aim of the present work was to enhance this data fitting method. The enhancement was attained using pre-fitting filters to deal with data points and uncertainties that fall too far from the perceived behavior of the data, thus reducing the possibility that these very gross outliers would interfere with the fitting procedure. Moreover, a software implementation of the fitting procedure was developed, written in the Python computing language. The aim is that this software, still in an early stage of development, will be able to fit experimental data (initially, decay curves) dealing properly with outliers that may exist in the original dataset.