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Improvement of cross section representation models for core calculations

In reactor analysis, deterministic calculations requires accurate nuclear cross section representation. Considering the thermal-hydraulic feedback and other dependencies at the core level allows for the simulation of normal and accidental conditions.

The goal of this PhD program is to elaborate a high accuracy model for future reactor simulations aiming to improve the required input (lattice calculation), storage and performance.

Multivariate approximation by local methods such as B-splines, coupled with a sparse grid techniques has proven to be a powerful strategy for responding to these demands. These libraries are currently under development in Python using embedded FORTRAN routines for the main tensorial manipulations.

Future work will be directed to optimize the amount of XS calculation and distribution in the phase space by means of machine learning methods.

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