**A Polynomial Chaos Approach for Nuclear Data Uncertainties Evaluations**

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Our interest is particularly targeted towards uncertainties propagation study within nuclear models. In order to quantify the respective effects of input random coefficients on the cross section calculations, we use a polynomial chaos expansion to model the propagation of input uncertainties. A non-intrusive regression-based approach is proposed to allow to compute the Sobol indexes giving the relative importance of each parameter (or combinations thereof). The stochastic input is represented spectrally by employing orthogonal polynomial functionals from the Askey scheme as a trial basis to represent the random space. Two different kinds of orthogonal polynomials from the Askey scheme (Legendre and Hermite polynomials) are used as bases in random space. Their efficiency and convergence are studied in comparison with numerical solutions obtained by Monte Carlo simulations. It is also shown that the Quasi Monte Carlo method promises a substantial speed-up compared with the classical Monte Carlo method. The work is illustrated by exact and approximate solutions for the mean, variance and the probability distribution. Extensive numerical results are given.

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