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## Benchmark Dataset for the Verification of Point-Depletion Codes

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### Abstract

Accurate burnup calculations are fundamental to reactor source term analysis. However, the numerical solution of burnup equations is challenged by extreme stiffness. To support the official safety review of point-depletion codes in China by the Nuclear and Radiation Safety Center (NSC), this paper presents a standardized benchmark dataset developed by the Institute of Nuclear and New Energy Technology (INET), Tsinghua University. Unlike some depletion benchmarks that require coupling with neutron transport, this dataset is specifically designed for the isolated verification of burnup solvers. It comprises seven benchmark cases of diverse scales and complexities, ranging from simplified chains to large-scale, highly stiff systems. To ensure a standardized evaluation, pre-processed burnup matrices are provided for each case, thereby allowing users to bypass complex nuclear data processing. High-precision reference solutions are established through the cross-verification of CRAM and TTA methods, with results reported in scientific notation to nine decimal places. This dataset provides a robust technical baseline for evaluating the computational precision and numerical stability of modern point-depletion codes.

*Note: Figure translations are in progress. See original paper for figures.*

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