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Development of point kernel gamma ray shielding code

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Abstract

[en] MCkeff code developed at the Manipal Centre for Natural Sciences, Manipal Academy of Higher Education, Manipal, meant for estimating the neutron multiplication factor of fissile systems and is currently extended to solve gamma ray shielding problems in complex source shield geometries by point kernel method. The MCkeff code adopts the input file format of MCNP, a widely used Monte Carlo code, in which any arbitrary configuration of shield materials contained in cells can be described by its bounding surfaces (linear and quadratic) by combining them with Boolean operators of intersection, and union. And the radiation source characteristics are specified by the 'SDEF' card (geometry, energy and angular distribution). The code identifies the problem type (criticality or shielding) by the presence or absence of an ^{S}DEF card. Besides this, in extended MCkeff code, the keyword 'point kernel' is used in a comment card of an input file to specify a shielding problem. This way, the same input file without any modification can be used for detailed simulation by the Monte Carlo code MCkeff. (author)

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