

MULTIGROUP CONSTANTS

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In neutron transport calculations the energy variable is usually discretized such that the energy region is divided into a number of energy groups. All neutrons within a group are assumed monoenergetic. In the groups the weighted average values of the neutron data (i.e. the group constants) are calculated. The weighting function is the neutron spectrum. Typical group constants required for the transport calculations are the group averaged reaction cross sections, the scattering matrices, the average number of neutrons per fission and others.

Calculation of the multigroup constants in the resonance region is performed with the neutron spectrum which is deformed locally due to self shielding of the resonances. In calculating the detailed flux deformation the Goldstein Cohen's theory⁽¹⁾ is applied instead of the standard NR or WR approximations. The Forti approximation⁽²⁾ for the Goldstein Cohen parameter is used. Such a procedure for treating the resonance-screened group constants was found to give good results.

To calculate the multigroup constants a large computer package FEDGROUP⁽³⁾ was brought into working order and implemented to CDC machine CYBER 72. The 69 group system as used by the reactor lattice code WIMS⁽⁴⁾ was chosen. The calculated multigroup constants were used in the calculations of the core of the Krško Nuclear Power station.

References

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