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论文

中子迁移方程的守恒差分方法与特征值问题

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摘要:

本文给出数值求解中子迁移Boltzmann方程的一种基于积分守恒原理的差分方法,把它运用于解算轴对称情况的特征值问题;同时为了求主特征值和相应的特征函数,给出了一种人为临界的方法。有关方法的要点如下:

关键词:

CONSERVATIVE DIFFERENCE METHOD FOR NEUTRON TRANSPORT EQUATION AND EIGENVALUE PROBLEM

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Abstract:

The Boltzmann equation for neutron transport in configuration space (Ⅰ) is exp-ressed in an integral form of conservation (Ⅱ) in suitable phase space. Based onthis principle together with cellular subdivision and piece-wise linear approximationa conservative difference scheme is established and is applied to the eigenvalue pro-blem for axisymmetric case. The conservativeness assures the accuracy of the method.For the determination of the principal eigenvalue λ_0, and its corresponding eigenfunc-tion of (Ⅲ) a method of artificial criticality is suggested, i.e., an artificial eigen-value k(λ) depending on the parameter λ is introduced (Ⅳ) and λ = λ_0, is obtainedby adjusting λ so that k(λ) = 1. The numerical computation of the system of dif-ference equations is carried out along the direction of the characteristics, thus givesan advantage in computing simplicity and an enormous saving in storage. Thiswork was done in early 1960's and it seems to be worth while to publish. it heresince it still contains some novel points even at present.

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