

The *Quasi*-Random Discrete Ordinates Method and the Ray Effect on Particle Transport Simulations

Pedro Henrique de Almeida Konzen*
Instituto de Matemática e Estatística
Universidade Federal do Rio Grande do Sul
RS, Brazil

It is considered the numerical simulations of particle transport problems modeled by the linear Boltzmann equation. One of the most widely used techniques to solve such integro-differential equation is the Discrete Ordinates Method (DOM). It consists in approximating the integral term by using an appropriate quadrature set, which leads to a system of first order partial differential equations. One of its well-known disadvantage is the appearance of unrealistic oscillatory solutions known as the ray effects. As an alternative, it is presented the recently developed *Quasi*-Random Discrete Ordinates Method (QRDOM), which preserves the main characteristics of the DOM, but it has the advantage of providing approximate solutions with mitigated ray effects. Its central idea is to explore a *quasi* Monte Carlo integration within the classical source iteration technique. Through the discussion of benchmark problems, the advantages and disadvantages of the application of the QRDOM with finite element discretization are presented. As well, the potential further applications to more complex particle transport problems are discussed.

*pedro.konzen@ufrgs.br