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Peruvian Conference on Scientific Computing

October 3 - 6, 2022
Universidad Nacional de San Antonio Abad del Cusco
Cusco - Perú

Topics of Interest

- Modelling, Simulation & Optimisation
- Computational Fluid Dynamics
- Subsurface Flows
- Mathematical Epidemiology
- Climate and Environmental Topics
- Finite Elements

Invited Speakers

- Roland Becker (Univ. Pau, France)
- Erik Burman (UCL - London, UK)
- Omar Ghattas (Univ. of Texas at Austin, USA)
- Roxana Lopez-Cruz (UNMSM, Lima, Perú)
- Insa Neuweiler (Univ. of Hannover, Germany)
- Olga Vasilieva (Univ. del Valle, Colombia)

PeC³ Peruvian Competence Center of Scientific Computing

DAAD Deutscher Akademischer Austausch Dienst German Academic Exchange Service

BMZ Federal Ministry for Economic Cooperation and Development

UNSAAC Universidad Nacional de San Antonio Abad del Cusco

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QRDOM with FEM for anisotropic transport problems

Pedro H.A. Konzen [1] Leonardo F. Guidi [2] Thomas Richter [3]

It is consider the numerical simulation of one group neutron transport problems in anisotropic media in rectangular domains. Such problems can be modeled by an integral-differential equation, and one of the most widely used techniques to solve it is known as the Discrete Ordinates Method (DOM). It consists in approximating the integral term by using an appropriate quadrature set, which leads to a system of partial differential equations. It is well known that the DOM approximation may produce unrealistic oscillatory solutions known as the ray effects. As an alternative, it is presented the 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, we present the advantages and disadvantages of the application of the QRDOM with finite element discretization. As well, we point its potential further applications to more complex particle transport problems.

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