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News

Fundamental Research

On 18 January 2019, IFPEN researchers **Léo Agélas** and **Guillaume Enchéry**, along with co-authors Martin Schneider and Bernd Flemisch from the University of Stuttgart, received an award for their paper on "***Convergence of nonlinear finite volume schemes for heterogeneous anisotropic diffusion on general meshes***", published in the Journal of Computational Physics.

This paper was one of the University of Stuttgart's top ten papers of 2018. It was produced while Martin Schneider was based at IFPEN as a visiting PhD researcher.

The research was carried out within the framework of IFPEN's agreement with the University of Stuttgart's SFB1313 network, previously named, NUPUS.

The highlights of the paper include:

- Introduction of a family of finite-volume-type space discretization schemes, centered on meshes and non-linear in order guarantee the positivity or the respect of the maximum principle of discrete solutions.
- Mathematical analysis of the convergence of these schemes for diffusion problems.
- Introduction of a general theoretical framework for this convergence analysis.
- Numerical study of their convergence speed using several examples of anisotropic and heterogeneous diffusion problems, discretized with different meshes.

- Comparison of the solutions obtained with these non-linear formulations and other schemes widely used schemes.

Reference

“*Convergence of nonlinear finite volume schemes for heterogeneous anisotropic diffusion on general meshes*”
M. Schneider, L. Agélas, G. Enchéry, B. Flemisch
Journal of Computational Physics, Volume 351, pp 80-107.
>> https://doi.org/10.1016/j.jcp.2017.09.003

University of stuttgart award
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