Departamento de Matemática

Centro de Matemática e Aplicações

Seminar/Talk

Towards Optimal Cooling Channel Layouts for Injection Moulds Enabled by Metal 3D Printing: A Geometric Approach

Miguel Belbut Gaspar

CDRSP - Instituto Politécnico de Leiria

Abstract: This seminar will present preliminary research addressing the challenge of designing effective cooling channel layouts for injection moulds, leveraging recent advances in metal 3D printing technology. Traditional manufacturing methods limit cooling channels to piecewisestraight drilled paths, restricting their efficiency in heat transfer and fluid flow. Metal additive manufacturing now allows complex, unconstrained channel geometries to be embedded directly within moulds, opening new possibilities for performance improvement. Our work aims to develop computational methods to generate near-optimal channel layouts, moving beyond the commonly used ad-hoc or hand-drawn designs. We focus on combining geometric modeling with principles from heat transfer and hydrodynamics to formulate and solve this problem. In this presentation, I will discuss the industrial motivation and context for this problem, the challenges posed by unconstrained channel design, earlystage modeling approaches and algorithmic strategies, as well as expected benefits and potential future directions. The seminar will highlight the intersection of geometry, computation, and manufacturing technology, illustrating how these fields contribute to solving practical engineering problems.

- **Dia:** 25 de Junho de 2025, às 15h30min.
- **Local:** Sala de Reuniões, Departamento de Matemática, UBI

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