

日時：2024年3月28日（木） 15:00～16:50

会場：中央大学後楽園キャンパス3号館14階 AI/データサイエンスセンターセミナー室

< プログラム >

15:00～15:05 開会挨拶 慶應義塾大学 村松 眞由

15:05～15:50 講演1（講演40分+質疑応答5分）

題目：Finite Element Simulation of Complex Fluids and Applications in Production
Technology

講師：Marek Behr（RWTH Aachen University）

発表言語：英語

講演概要：

Many flows of engineering interest involve fluids which are governed by complex constitutive relations. For viscoelastic fluids in particular, stabilized formulations of Variational Multi-Scale (VMS) type can provide robustness and accuracy. They also allow arbitrary combinations of basis functions, including equal-order interpolations for all fields [1]. Development of these methods is motivated by applications in production technology: injection molding and additive manufacturing.

Flows of polymer melt as it fills a cavity [2] or exits the printing nozzle [3] may be highly influenced by the microstructure of the material and by thermal effects.

1. S. Wittschieber, A. Rangarajan, G. May, and M. Behr, Metric-Based Anisotropic Mesh Adaptation for Viscoelastic Flows, *Computers and Mathematics with Applications*, 151 (2023) 61–79.

2. B. Ferrer Fabon, J. Alms, M. Behr, and C. Hopmann, High-Resolution Numerical Simulations of Polymer Injection Molding: Analysis of Mesh Size and Refinement, *Proceedings in Applied Mathematics and Mechanics*, 23 (2023) e202300245.

3. F. Gonzalez, S. Elgeti, and M. Behr, Surface-Reconstruction Virtual-Region Mesh Update Method for Flow Problems with Topology Changes, *International Journal for Numerical Methods in Engineering*, 124 (2023) 2050–2067.

15:50 ~ 16:00 休憩

16:00 ~ 16:45 講演 2 (講演 40 分 + 質疑応答 5 分)

題目 : Invitation to topology optimization for fluid problems —from traditional to AI-based approaches—

講師 : 矢地謙太郎 (大阪大学)

発表言語 : 英語

講演概要 :

Topology optimization is a powerful design approach to determine an optimized shape and topology of a structure under a high degree of design freedom. This presentation will introduce its basic idea and mathematical formulation for fluid problems and demonstrate the efficacy of the traditional and recent AI-based approaches through numerical examples.

16:45 ~ 16:50 閉会挨拶 東北大学 寺田 賢二郎