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Laboratoire PMMH
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ESPCI PARIS
EDUCATION SCIENCE INNOVATION

Séminaire café - PMMH

Bureau d'Études, Batiment L, 2 ème étage

Jeudi 09 février 2017, 13h30

Arthur Ghigo

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Simulation of blood flow in large elastic arteries : Reduced-order models and applications.

One-dimensional reduced-order models are commonly used to describe blood flow in large elastic arteries. They provide a simple fluid-structure interaction mathematical framework that allows to numerically compute with satisfying accuracy average blood flow quantities such as the flow rate or the cross-sectional area. Their low computational cost enables the simulation of blood flow in large networks of arteries, therefore capturing the network dynamics that are essential to reproduce in-vivo data.
We present here our work on such one-dimensional models for blood flow. Our presentation will be structured in two parts. We first discuss the fluid and the solid models and analyze how they influence blood flow. We point out their limitations and propose improvement strategies. We then present an example of application : the simulation of blood flow in a 55 arteries network in the presence of stenosis (constriction) of the right leg. We investigate how the pathology affects the network dynamics and numerically assess the viability of different surgical treatments for this pathology.

Prochain séminaire : jeudi 16 février 2016 **à 13h30**,
À déterminer.

Programme des séminaires café : https://www.pmmh.espci.fr/?-Seminaire-Cafe-Interne-
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