

On fluid-structure simulations in hemodynamics

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Resumo

In the last years an increasing interest in fluid-structure patient-specific hemodynamic simulations has been witnessed due to the large amount of information these models are able to provide non-invasively at a low cost, concerning both: flow patterns of blood circulation as well as stress conditions of the arterial wall. Several and important aspects must be adequately considered towards obtaining realistic physiological environments for such simulations (initial conditions, boundary conditions, etc.). In this talk we will discuss relevant issues in fluidstructure hemodynamics modeling, namely (i) histologically-inspired constitutive models, (ii) fluid-structure interaction, (iii) consistent fluid-solid boundary data, (iv) existence of surrounding tissues, and (v) realistic baseline stress conditions. Particularly, we will discuss the importance of considering preload (due to pressure state) and pre-stretch (due to tethering forces) in the stress state obtained from the fluid-structure interaction simulations.