Computational Fluid-Structure Interaction Study of a New Wave Membrane Blood Pump

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Wave Membrane Blood Pumps (WMBPs), developed at CorWave SA (France), are novel left ventricular assist devices in which blood propulsion arises from the progressive wave propagation along an oscillating immersed membrane. In this talk, we will describe the Fluid-Structure-Contact Interaction model employed to simulate the pump system for different operating conditions of the device. The presented numerical results will address the comparison of the performance of two different pump designs and a parametric analysis of the pump behaviour with respect to both hydraulic and hemocompatibility-related output. Validation results against in-vitro experimental data will be provided. Finally, we will consider a new operating point of the device, which showed the potentital of achieving physiologic flow rate target at diastolic pressure conditions, in view of the clinical application in the upcoming first-in-human trials.