Reduced order modelling for cardiovascular flows in parametrized settings: focus on Coanda Effect in Mitral Valve Regurgitation

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ABSTRACT

Some recent developments of reduced order modelling (ROM) in computational fluid dynamics applied to cardiovascular flows will be discussed. The main topics will be the use of combined ROM techniques currently available, efficient sampling procedures, inf-sup pressure stabilization for ROM approaches, error bounds, and computational performances [1]. Spectral element method is used for basis generation. Emphasis will be placed on the stability of flows [2,3]: symmetry breaking and Hopf bifurcation. With the above-mentioned techniques, we will undertake a numerical study to understand the causes of the Coanda effect, which is associated with symmetry breaking [4]. The ultimate goal is to gain a deeper understanding of the Coanda effect in intracardiac blood flow occurring in certain patients affected by Mitral Valve Regurgitation.

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