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COMPUTATIONAL MODEL OF A HEART CHAMBER

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In the literature, there are different possibilities of modeling for the human heart. The model of Henriques, Mady and Oliveira-Junior [2] considers each atrium-ventricle pair to be a cavity, since the two valves that separate the atria from the ventricles operate passively. In addition, it considers that each part of the heart has only one entry and one exit with cross-sectional areas equivalent to the sum of the cross-sectional areas of the real arteries and veins that connect to the respective part of the heart.

The present work aims to build a computational model of a heart chamber through the theory of fluid mechanics using the finite element method. Towards solving the Navier-Stokes equation, it will be used a program developed by the author in Fortran code, based on the work of Correa and Loula [1]. Finally, computational simulations will be performed for this chamber. In the future, an analysis of the numerical results will be carried out from the Second Law of Thermodynamics, in exergetic analysis perspective, in order to evaluate the inefficiencies of the heart. It has already been shown that problems such as obstruction or stenosis of a valve lead to an increase in the destroyed exergy [3], but this model may help to predict behaviors for future analysis.

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