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A heart model in the whole circulatory system

We present a mathematical model of left heart governed by the partial differential equations. This heart is coupled with a lumped model of the whole circulatory system governed by the ordinary differential equations. The immersed boundary method is used to investigate the intracardiac blood flow and the cardiac valve motions of the normal circulation in humans. We investigate the intraventricular velocity field and the velocity curves over the mitral ring and across outflow tract. The pressure and flow are also measured in the left and right heart and the systemic and pulmonary arteries. The simulation results are comparable to the existing measurements.