

TOWARDS HEMODYNAMIC AND FSI ANALYSIS IN HYPERTROPHIC CARDIOMYOPATHY

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Hypertrophic cardiomyopathy is the most prevalent form of inherited heart failure, affecting 1:500 individuals. Progression into more severe symptoms occurs in approximately 2 out of 3 patients, with disease progression commonly associated with obstruction of the aortic valve and significant hemodynamic losses. How patients progress and how to best treat this condition depends on the severity of disease and the key factors influencing increased hemodynamic burden. In this talk, we present our latest work toward understanding the hemodynamics of the ventricle using PCMRI, introducing a new technique for interpreting relative pressure gradients. While this technique is helpful in facilitating our understanding of the ventricular function, understanding the drivers of disease requires knowledge of the influence of the left ventricular muscle, mitral valve, and blood flow. For this, we introduce a novel extension of our previous FSI work in the heart for handling this complex multi-physics system, relying on local enrichment of finite element velocity space. Preliminary test results are presented on classic FSI benchmark problems.