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Analysis of intracardiac flows for Diastolic heart dysfunction[1] RAJAT MITTAL, XUDONG ZHENG, VIJAY VEDULA, THEODORE ABRAHAM, Johns Hopkins University — Diastolic dysfunction (DD) is a common finding in a variety of cardiac diseases including hypertension, coronary disease and cardiomyopathy. Its prevalence increases with age and it manifests as incomplete or/and delayed ventricular relaxation and a compensatory stronger atrial contraction. DD is often associated with heart failure and contributes greatly to morbidity and hospitalizations especially in the elderly. In the current study, three-dimensional Navier-Stokes simulations are employed to investigate intracardiac flow behavior in normal and diseased hearts with DD. The endocardial surface of the left ventricle is represented by a generic simplified prolate-spheroid and the wall motion is driven by the ventricular volume change. Diastolic dysfunction in the heart is modeled by prescribing different E/A filling ratios. The dominant flow features, such as vortices and swirling structures and associated Eulerian and Lagrangian metrics are examined to gain insights into the flow physics of this disease.

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