Analysis of intracardiac flows for Diastolic heart dysfunction\textsuperscript{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.

\textsuperscript{1}This research was supported by the National Science Foundation through TeraGrid Grant TG-CTS100002.

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Date submitted: 11 Aug 2011  
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