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Simulations of bubble collapse in viscous and viscoelastic media near a second viscoelastic medium MAURO RODRIGUEZ, ERIC JOHNSEN, University of Michigan, Ann Arbor — Understanding the dynamics of cavitation bubbles and the shock waves emitted by their collapse in a viscoelastic medium is important for various naval and medical applications. Two examples are histotripsy, which utilizes this phenomenon for the ablation of pathogenic tissue, and erosion to elastomeric coatings on propellers. To study these problems in a general sense, a canonical problem is considered, which involves the shock-induced collapse of a gaseous bubble in a viscous or viscoelastic medium next to a second viscoelastic or elastic medium of a certain thickness. A novel Eulerian approach, which incorporates nonlinear elasticity, is used to simulate this problem. The stresses, strains and temperatures produced during this process will be presented for different initial stand-off distances, thicknesses of the second medium and shear moduli. Additionally, studies using relevant waveforms that induce the bubble collapse will be presented.

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