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Stability of hypersonic compression cones[1] HELEN REED, JOSEPH KUEHL, EDUARDO PEREZ, TRAVIS KOCIAN, NICHOLAS OLIVIERO, Texas A&M University — Our activities focus on the identification and understanding of the second-mode instability for representative configurations in hypersonic flight. These include the Langley 93-10 flared cone and the Purdue compression cone, both at 0 degrees angle of attack at Mach 6. Through application of nonlinear parabolized stability equations (NPSE) and linear parabolized stability equations (PSE) to both geometries, it is concluded that mean-flow distortion tends to amplify frequencies less than the peak frequency and stabilize those greater by modifying the boundary-layer thickness. As initial disturbance amplitude is increased and/or a broad spectrum disturbance is introduced, direct numerical simulations (DNS) or NPSE appear to be the proper choices to model the evolution, and relative evolution, because these computational tools include these nonlinear effects (mean-flow distortion).

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