

Abstract Submitted
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A least order model for temporally-developing compressible shear layers BASHAR QAWASMEH, MINGJUN WEI, New Mexico State University — A modified Proper Orthogonal Decomposition/Galerkin projection method has been successfully used to obtain models at very low dimension for incompressible temporal shear layers (Wei and Rowley, 2009). In this study, we applied a similar approach on compressible shear layers. To factor out the downstream viscous growth and then obtain models at lower dimension, our modified POD/Galerkin approach includes a dynamically scaling variable counting the overall thickness variation by viscosity. For compressible flow, we changed to use an inner product with both kinetic and thermal energy (Rowley, Colonius, Murray, 2004), then got the Galerkin model from the projection of the isentropic Navier-Stokes equations. The compressible model shows the capability to capture shear layer dynamics similarly but also slightly better than its incompressible version. More importantly, certain compressible characteristics is still kept in the new model.

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