

Abstract Submitted  
for the DFD08 Meeting of  
The American Physical Society

**Development and Calibration of a Reduced Order Modelling for subsonic cavity flows** KAUSHIK KUMAR NAGARAJAN, CHRISTOPHE AIRIAU, AZEDDINE KOURTA, IMFT, France, LAURENT CORDIER, LEA, POITIERS, France — In this study we propose a new calibration technique for the development of a Reduced Order Model (ROM) for a compressible cavity. A DNS is performed for a 2D rectangular cavity at a Mach number of 0.6 and a Reynolds number of 52 (based on the momentum thickness) which corresponds to a shear mode of the cavity oscillations. The technique of Proper Orthogonal Decomposition (POD) is utilised to get the most dominant flow dynamics, a ROM based on the isentropic equations is developed by projecting the governing equations on the subspace spanned by the POD modes resulting in a dynamical system. The dynamical system is then utilised to predict the flow dynamics, but the main disadvantage of the ROM is that the system fails to predict the large time temporal dynamics. In this work we propose a way to stabilise the dynamical system to predict accurately the flow dynamics. This enhances the usefulness of the ROM for control applications.

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Date submitted: 23 Sep 2008

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