

Abstract Submitted  
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**Dynamic k-Equation Model for LES of Compressible Flows<sup>1</sup>** XI-  
AOCHUAN CHAI, KRISHNAN MAHESH, University of Minnesota — The sub-  
grid scale (SGS) kinetic energy (KE) has to be modeled in LES of compressible  
flows. Standard compressible versions of the dynamic Smagorinsky model (DSM)  
use Yoshizawa's expression for SGS KE. However, it is well known that Yoshizawa's  
Model tends to under-predict the magnitude of SGS KE. Obtaining the SGS KE from  
its transport equation, has shown improved performance for incompressible flows (e.g.  
Ghosal *et al.* 1995, Kim & Menon 1996). We develop a compressible version of the  
DSM model with SGS KE equation. The SGS KE transport equation for compress-  
ible flow is derived, and the unclosed terms in the compressible KE equation are  
modeled and dynamically closed using the Germano identity. The proposed model  
is applied to decaying isotropic turbulence and normal shock/isotropic turbulence  
interaction.

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