Large eddy simulation with energy and helicity flux constraint YI-PENG SHI, Peking University, ZUO-LI XIAO, Johns Hopkins University, ZHEN-SU SHE, Peking University, SHI-YI CHEN, Peking University, Johns Hopkins University — The energy and helicity flux constraints are imposed on the dynamic procedure of LES. The coefficients in the sub-grid scale stress model are determined by minimizing the error $E = \left\langle (L_{ij} - (T_{ij}^{mod} - \overline{\tau_{ij}^{mod}}))^2 \right\rangle$ in satisfying the Germano identity under the energy and helicity flux constraints $\left\langle \tau_{ij}^{mod} \tilde{S}_{ij} \right\rangle = \Pi_E$, and $\left\langle \tau_{ij}^{mod} \tilde{R}_{ij} \right\rangle = \Pi_H$. Both a *priori* test and a *posteriori* test of the present SGS model are performed. Given proper energy and helicity flux functions Π_E and Π_H, this constrained dynamic SGS model not only achieves a good r.m.s approximation of real SGS stress but also preserves the correct energy and helicity flux.

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Date submitted: 04 Aug 2006   Electronic form version 1.4