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Characteristics of the residual stress tensor as a function of length scale in simulations of stably stratified turbulence[1] FELIPE AUGUSTO DE BRAGANCA ALVES, STEPHEN DE BRUYN KOPS, University of Massachusetts Amherst — *A priori* analysis of the relationships between the deviatoric residual stress tensor τ^r and kinematic tensors is made for stably stratified Boussinesq turbulence. Two data sets from direct numerical simulation are used for the analyses: the decaying Taylor-Green simulations of Riley and de Bruyn Kops(2003), and the forced homogeneous stratified turbulence simulations of Almalkie and de Bruyn Kops(2012) resolved on up to $8192 \times 8192 \times 4096$ grid points. The data sets are filtered using a Gaussian kernel with filter widths up to the buoyancy scale. Through tensor decomposition theorems described in Thompson et al.(2010) the relationship between the strain rate tensor and the residual stress is quantified for each filter width and case. This is also done for the tensor formed by the Lie product between the strain rate and rate of rotation tensors. The role of each tensor, seen as a part of the residual stress tensor, is analyzed, in particular with respect to filtered kinetic energy budget equation.

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