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Realizable Closure Model for the Reynolds Stress in Rotating Frames CHARLES PETTY, ANDRE BENARD, Michigan State University — The Reynolds-averaged Navier-Stokes equation for constant property Newtonian fluids is unclosed due to the explicit appearance of the normalized Reynolds stress and the turbulent kinetic energy. A non-negative algebraic mapping of the normalized Reynolds stress into itself provides a practical closure for a wide class of flows. Unlike eddy viscosity closure models, the theory predict the redistribution of the turbulent kinetic energy among the three components of the fluctuating velocity field for statistically stationary spanwise rotating channel flows as well as the Coriolis re-distribution of turbulent kinetic energy among the three components of the fluctuating velocity field in rotating homogeneous decay. The results partially support the conjecture that the index-of-refraction of the troposphere is anisotropic at all scales.

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