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A Taylor-Microscale Transport Model for RANS DANIEL ISRAEL, Los Alamos National Laboratory, ABIGAIL HSU, Stony Brook University, JOSHUA RUDOLPH, Purdue University — Since the first development of complete two-equation RANS models, there have been a variety of proposals for the choice of a second scaling quantity. Some of the most popular have been a time-scale ω (Kolmogorov, 1942; Wilcox, 1998), the dissipation rate ε (Harlow et al., 1968), the integral length-scale L, and the product kl (Mellor et al., 1982). All of these are formally equivalent in the production and dissipation terms, and differ only in which quantity is turbulently diffused. They also all rely on an equilibrium assumption that links the dissipation rate at the small scales to the scale of the large eddies. We propose using the Taylor microscale as the second scale. This has several nice properties, and also exhibits some interesting mathematical differences from conventional models. We show results for some simple shear flows using the new model.

Daniel Israel
Los Alamos National Laboratory

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