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Comparison of Low Reynolds Number k-ε Turbulence Models in Predicting Fully Developed Pipe Flow

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A comparative study is presented of tend different versions of the low Reynolds number k-ε turbulence model. The individual models are briefly outlined and evaluated by application to fully developed pipe flow. Numberical simulations were performed at Reynolds numbers of 7000, 21,800, 50,000, and 500,000. Predictions of the mean axial velocity, turbulent kinetic energy, Reynolds shear stress, edy viscosity, and skin friciton coefficients are compared to both experimental and direct numerical simulation data. The relative performance of the models is assessed. It has been found that the predictions between the models can vary considerably, particularly for the turbulent kinetic energy, its dissipation rate, and the eddy viscosity. The results indicate the model proposed by Myong and Kasagi (1990, *JSME Int. J*., **33**, 63-72) has the best overall performance in predicting fully developed, turbulent pipe flow.