Comparison of Eddy Viscosity Models and Reynolds Stress Model for the Prediction of Flow in a Rod Bundle with the Flow Deflector

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Abstract

A computational fluid dynamics analysis is conducted to evaluate the prediction performance of the standard and RNG $k-\varepsilon$ eddy viscosity models, and differential stress model (DSM). A 5x5 rod array with the split vane is simulated and the numerical predictions are compared with the experimental results where applicable. The curvature-compensated convective transport (CCCT) scheme is used to discretise the convection term. There is a negligible difference in the prediction performance between the standard and RNG $k-\varepsilon$ models. DSM was found to more accurately predict characteristics of turbulent flow in the fuel bundle with the flow-deflecting vane.