UNIVERSITI TEKNOLOGI MARA

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ABSTRACT

This study presents the validation of two equation turbulence model (k-epsilon) that incorporates fixed variables of exit Reynolds number 2.8 x 10^6 and 0.79 as exit isentropic Mach number on a turbine blade simulation by ANSYS software. The boundary condition of this study has been set to be 140kPa and 280K as the inlet pressure and inlet temperature of the model. The validation of dimensionless pressure distribution, isentropic Mach number and Fast Fourier Transformation (FFT) has been used as parameter study. The result of isentropic Mach number around the blade has recently indicates very good agreement with the experiment while the result of FFT captures the pressure fluctuation at trailing edge of the turbine blade with the 4.6% of discrepancy with experiment result. For the dimensionless pressure distribution, the result has some discrepancy. Then, a new hybrid turbulence model has been done and the improvement of the result has been achieved. The result of hybrid equation shows that isentropic Mach number and dimensionless pressure distribution validation became closer to the experimental result compared to the unmodified equation. Thus, the calculation that should be used to obtain a better result is by isentropic relation for total inlet pressure as it could be farther result to the experiment if directly uses a total pressure.

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TABLE OF CONTENTS