

UNIVERSITI TEKNOLOGI MARA

**VALIDATION OF TURBINE BLADE
GEOMETRY BY USING A
MODIFIED EQUATION SPALART
ALLMARAS TURBULENT MODEL**

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MSc

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ABSTRACT

The study represents the validation of one equation turbulence model (Spalart Allmaras) that incorporates fixed variables of exit Reynolds number is 2.8×10^6 and the exit isentropic Mach number is 0.79 on a turbine blade geometry. The computational simulation is done by ANSYS 16.2 with a minimum grid size of 2×10^{-3} mm using two different cases. For Case I the inlet is 140kPa for pressure and 280K for temperature whereas for Case II the inlet is 92.755kPa for pressure and 2.48.93K for temperature. The validation being done on dimensionless pressure, isentropic Mach number and Fast Fourier transformation (FFT) for both cases. The result of isentropic Mach number around the blade indicates very good agreement with the experiment. For frequency validation, the higher fluctuation on the trailing edge shows discrepancy about 9% with experiment results for Case I and 1% for Case II. Dimensionless pressure strongly disagrees with previous results. The modification done towards the standard one equation turbulence model for destruction parts by derivation of “d”. The results of hybrid equation show improvement on the dimensionless pressure and isentropic Mach number.

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