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Numerical Investigation the Effect of Adjustable Guide Vane for Improving the Airflow Rate in Axial Fans

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Abstract : The main objective of this study is to clarify the effect of the adjustable outlet guide vane (OGV) on the axial fan. Three-dimensional Numerical study was performed to analyze the effect of adjustable guide vane for improving the airflow rate in axial fans. Grid independence test was done between five different meshes in order to choose the reliable mesh. In flow analyses, Reynolds averaged Navier-Stokes (RANS) equations was solved using three types of turbulence models named k-ε, k-ω and k-ω SST. The aerodynamic performances of the fan and guide vane were evaluated. Numerical method was validated by comparing with experimental test according to AMECA 210 standard. Results showed that, by using the adjustable guide vane the airflow rate is increased around 3% to 6 %. The maximum enhancement of the airflow rate was achieved when pressure was 374pa.

Keywords : axial fan, adjustable guide vane, CFD, turbo machinery
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