Scale Adaptive Simulation Model for the Darrieus Wind Turbine - DTU Orbit (09/02/2019)

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Accurate prediction of aerodynamic loads for the Darrieus wind turbine using more or less complex aerodynamic models is still a challenge. One of the problems is the small amount of experimental data available to validate the numerical codes. The major objective of the present study is to examine the scale adaptive simulation (SAS) approach for performance analysis of a one-bladed Darrieus wind turbine working at a tip speed ratio of 5 and at a blade Reynolds number of 40 000. The three-dimensional incompressible unsteady Navier-Stokes equations are used. Numerical results of aerodynamic loads and wake velocity profiles behind the rotor are compared with experimental data taken from literature. The level of agreement between CFD and experimental results is reasonable.

General information
State: Published
Organisations: Department of Wind Energy, Fluid Mechanics, Warsaw University of Technology
Contributors: Rogowski, K., Hansen, M. O. L., Maroński, R., Lichota, P.
Number of pages: 11
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Journal of Physics: Conference Series (Online)
Volume: 753
Article number: 022050
ISSN (Print): 1742-6596
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 0.48 SJR 0.241 SNIP 0.447
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 0.45 SJR 0.24 SNIP 0.401
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 0.35 SJR 0.252 SNIP 0.374
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 0.32 SJR 0.264 SNIP 0.352
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 0.25 SJR 0.245 SNIP 0.293
ISI indexed (2013): ISI indexed no
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 0.33 SJR 0.293 SNIP 0.387
ISI indexed (2012): ISI indexed no
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 0.43 SJR 0.293 SNIP 0.356
ISI indexed (2011): ISI indexed no
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.288 SNIP 0.351
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.259 SNIP 0.346
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.264 SNIP 0.301
Web of Science (2008): Indexed yes