View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Online Research Database In Technology

Study of wind turbine wake modeling based on a modified actuator disk model and extended k-ε turbulence model - DTU Orbit (08/11/2017)

Study of wind turbine wake modeling based on a modified actuator disk model and extended k-ε turbulence model

This paper presented an improved computational fluid dynamics (CFD) model for simulating a horizontal-axis wind turbine wake. The model used the actuator disk model to simplify the wind turbine effect on the aerodynamic field by adding an extra momentum source and an improved term to correct the underestimation issue of the wind speed deficit when applying the STD k-ε model. In addition, the model also introduced a radial distribution function to assess the non-uniform load on the actuator disk and a coefficient C4ε of the turbulent source. To validate the model, the wind turbines of Nibe `B' and Dawin 180/23 were checked by different wake models with multiple entrance velocities. Results show that the improved wake model has better prediction accuracy with experimental data and can be used for wind turbine wake calculation.

General information

State: Published
Organisations: Department of Wind Energy, Fluid Mechanics
Authors: Xu, C. (Ekstern), Han, X. (Ekstern), Wang, X. (Ekstern), Liu, D. (Ekstern), Zheng, Y. (Ekstern), Shen, W. Z. (Intern), Zhang, M. (Ekstern)
Number of pages: 8
Pages: 1954-1961
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information

Journal: Zhongguo Dianji Gongcheng Xuebao
Volume: 35
Issue number: 8
ISSN (Print): 0258-8013
Ratings:
Scopus rating (2016): SJR 0.921 SNIP 1.207 CiteScore 2.5
Scopus rating (2015): SJR 0.876 SNIP 1.302 CiteScore 2.02
Scopus rating (2014): SJR 0.936 SNIP 1.634 CiteScore 1.78
Scopus rating (2013): SJR 0.921 SNIP 1.447 CiteScore 1.54
ISI indexed (2013): ISI indexed no
Scopus rating (2012): SJR 0.794 SNIP 1.379 CiteScore 1.44
ISI indexed (2012): ISI indexed no
Scopus rating (2011): SJR 0.679 SNIP 1.089 CiteScore 1.39
ISI indexed (2011): ISI indexed no
Scopus rating (2010): SJR 0.549 SNIP 0.97
Scopus rating (2009): SJR 0.495 SNIP 1.103
Scopus rating (2008): SJR 0.422 SNIP 1.048
Scopus rating (2007): SJR 0.375 SNIP 1.037
Scopus rating (2006): SJR 0.318 SNIP 1.226
Scopus rating (2005): SJR 0.469 SNIP 1.663
Scopus rating (2004): SJR 0.275 SNIP 1.268
Scopus rating (2003): SJR 0.304 SNIP 0.374
Scopus rating (2002): SJR 0.293 SNIP 0.255
Scopus rating (2001): SJR 0.227
Scopus rating (2000): SJR 0.104
Scopus rating (1999): SJR 0.104
Original language: Chinese
Electrical and Electronic Engineering, Actuator disk model, Computational fluid dynamics (CFD), Extended turbulent model, Wind turbine wake, Actuator disks, Actuators, Aerodynamics, Computational fluid dynamics, Distribution functions, Fluid dynamics, Turbulence models, Wakes, Wind, Aerodynamic field, Computational fluid dynamics modeling, Entrance velocity, Horizontal axis wind turbines, Prediction accuracy, Radial distribution functions, Turbulent models, Wind turbine wakes, Wind turbines
DOIs:
10.13334/j.0258-8013.pcsee.2015.08.015
Source: FindIt
Source-ID: 2288837436
Publication: Research - peer-review › Journal article – Annual report year: 2015