

(51) International Patent Classification:
F03D 7/04 (2006.01)(DK). **GODSK, Kristian Balschmidt** [DK/DK]; Blegdamsvej 22, 3. th., DK-2200 Copenhagen N (DK).(21) International Application Number:
PCT/EP2009/063911(74) Agent: **INSPICOS A/S**; P.O. Box 45, Kogle Allé 2, DK-2970 Hørsholm (DK).(22) International Filing Date:
22 October 2009 (22.10.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
PA 2008 01606 18 November 2008 (18.11.2008) DK
61/199,648 18 November 2008 (18.11.2008) US(71) Applicant (for all designated States except US): **VES-TAS WIND SYSTEMS A/S** [DK/DK]; Alsvej 21, DK-8940 Randers SV (DK).

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV,

[Continued on next page]

(54) Title: A METHOD FOR CONTROLLING OPERATION OF A WIND TURBINE

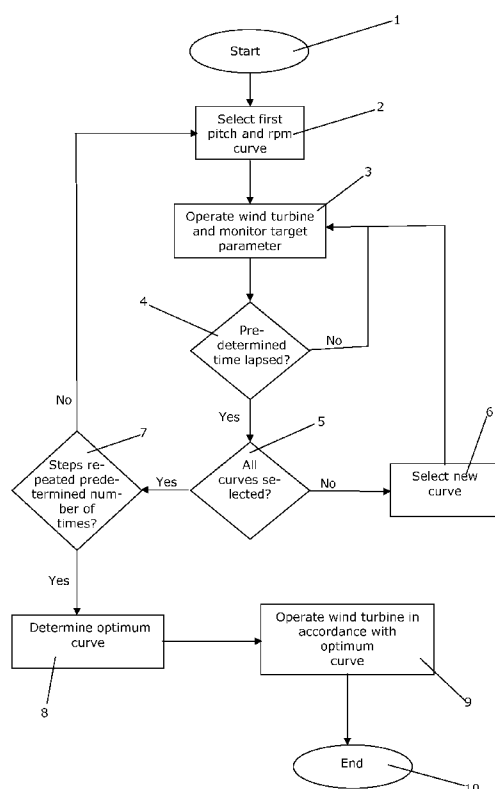


Fig. 1

(57) Abstract: A method for controlling operation of a wind turbine and a method for controlling operation of a plurality of wind turbines positioned in a wind farm are disclosed. According to the method, a pitch and rotational speed curve, e.g. a θ versus λ curve, is selected from a group of pitch and rotational speed curve, and the wind turbine is operated in accordance with the selected curve for a short period, while monitoring at least one target parameter, e.g. power production or loads on one or more components. This is repeated for each of the curves of the group of pitch and rotational speed curves. This is also repeated a predetermined number of times, i.e. each curve is selected in turn a predetermined number of times. Based on the monitored target parameters an optimum curve is determined from the group of pitch and rotational speed curve, and the wind turbine is operated in accordance with this optimum curve. The method ensures that the applied curve is in fact optimal for the specific wind turbine, at the specific site and under the specific conditions. Thereby the wind turbine can be operated in a more optimal manner, e.g. with respect to power production and/or loads or wear on components.



MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*

Published:

— *with international search report (Art. 21(3))*

(88) Date of publication of the international search report:

17 March 2011

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2009/063911

A. CLASSIFICATION OF SUBJECT MATTER

INV. F03D7/04

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F03D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2007/123552 A1 (MIDWEST RESEARCH INST [US]; JOHNSON KATHRYN E [US]; FINGERSH LEE JAY []) 1 November 2007 (2007-11-01) page 6, line 19 - page 7, line 2 page 9, line 5 - line 15 page 10, line 4 - line 21; figures 1,2,4 -----	1
A	US 2007/085343 A1 (FORTMANN JENS [DE]) 19 April 2007 (2007-04-19) paragraphs [0002], [0068], [0069], [0097]; figures 1,2 -----	1

☐ Further documents are listed in the continuation of Box C.


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Date of the actual completion of the international search

18 January 2011

Date of mailing of the international search report

25/01/2011

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2009/063911

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007123552 A1	01-11-2007	EP 2035899 A1 US 2009295159 A1	18-03-2009 03-12-2009
US 2007085343 A1	19-04-2007	EP 1665494 A1 WO 2005025026 A1	07-06-2006 17-03-2005