Title: Transient analysis of variable-speed wind turbines at wind speed disturbances and a pitch control malfunction

Author(s): Melício, R.[1]; **Mendes, V. M. F.**[2]; Catalão, J. P. S.[1,3]

Source: Applied Energy

Volume: 88 **Issue:** 4 **Pages:** 1322-1330 **DOI:** 10.1016/j.apenergy.2010.10.021 **Published:** Apr 2011

Document Type: Article

Language: English

Abstract: As wind power generation undergoes rapid growth, new technical challenges emerge: dynamic stability and power quality. The influence of wind speed disturbances and a pitch control malfunction on the quality of the energy injected into the electric grid is studied for variable-speed wind turbines with different power-electronic converter topologies. Additionally, a new control strategy is proposed for the variable-speed operation of wind turbines with permanent magnet synchronous generators. The performance of disturbance attenuation and system robustness is ascertained. Simulation results are presented and conclusions are duly drawn.

Author Keywords: Wind Energy; Power Converters; Transient Analysis; Power Quality

KeyWords Plus: Fractional Order Control; Power-System; Converters

Reprint Address: Catalão, JPS (reprint author), Univ Beira Interior, Dept Electromech Engn, R Fonte do Lameiro, P-6201001 Covilhã, Portugal.

Addresses:
1. Univ Beira Interior, Dept Electromech Engn, P-6201001 Covilha, Portugal
2. Inst Super Engn Lisboa, Dept Elect Engn & Automat, P-1959007 Lisbon, Portugal
3. Univ Tecn Lisbon, Inst Super Tecn, Ctr Innovat Elect & Energy Engn, P-1049001 Lisbon, Portugal

E-mail Address: catalao@ubi.pt

Publisher: Elsevier SCI LTD
Publisher Address: The Boulevard, Langford Lane, Kidlington, Oxford OX5 1GB, Oxon, England

ISSN: 0306-2619

Citation: MELÍCIO, R.; MENDES, V. M. F.; CATALÃO, J. P. S. - Transient analysis of variable-speed wind turbines at wind speed disturbances and a pitch control malfunction. Applied Energy. ISSN 0306-2619. Vol. 88, n.º 4 (2011) p. 1322-1330.