Title: Wind turbines equipped with fractional-order controllers: Stress on the mechanical drive train due to a converter control malfunction

Author(s): Melício, R.; Mendes, V. M. F.; Catalão, J. P. S.

Source: Wind Energy

Volume: 14 Issue: 1 Pages: 13-25 DOI: 10.1002/we.399 Published: Jan 2011

Document Type: Article

Language: English

Abstract: This paper is on variable-speed wind turbines with permanent magnet synchronous generator (PMSG). Three different drive train mass models and three different topologies for the power-electronic converters are considered. The three different topologies considered are respectively a matrix, a two-level and a multilevel converter. A novel control strategy, based on fractional-order controllers, is proposed for the wind turbines. Simulation results are presented to illustrate the behaviour of the wind turbines during a converter control malfunction, considering the fractional-order controllers. Finally, conclusions are duly drawn. Copyright (C) 2010 John Wiley & Sons, Ltd.

Author Keywords: Wind Turbines; Permanent Magnet Synchronous Generators; Modelling; Power Converters; Fractional-Order Control

KeyWords Plus: Transient Stability Analysis; Synchronous Generator; Power-System

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

Addresses:
1. Univ Beira Interior, Dept Electromech Engn, P-6201001 R Fonte Do Lameiro, Covilhã, Portugal
2. Inst Super Engn Lisboa, Lisbon, Portugal

E-mail Address: catalao@ubi.pt

Publisher: Wiley-Blackwell
Publisher Address: 111 River St, Hoboken 07030-5774, NJ USA

ISSN: 1095-4244