

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

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**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.

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