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# A Stochastic Approach to Extreme Wind Speeds Conditions on a Small Axial Wind Turbine

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**Abstract :** In this paper, to model a real life wind turbine, a probabilistic approach is proposed to model the dynamics of the blade elements of a small axial wind turbine under extreme stochastic wind speeds conditions. It was found that the power and the torque probability density functions even though decreases at these extreme wind speeds but are not infinite. Moreover, we also found that it is possible to stabilize the power coefficient (stabilizing the output power) above rated wind speeds by turning some control parameters. This method helps to explain the effect of turbulence on the quality and quantity of the harness power and aerodynamic torque.

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