

## **WECS virtual moment of inertia control for free and forced vibrations mitigation.**

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Operation of wind turbine generators (WTGs) has a number of features due to the stochastic nature of the primary energy source. As a result, the control of the installation implies regulation of multiple parameters that ensure optimal operating conditions for the internal units and elements of the WTG, and also allow them to meet the requirements of regulatory documents.

At the same time, the elements of wind turbines are subject to continuous impact of changing wind with sudden gusts and turbulent fluctuations in wind speed. The design of the wind turbine shaft favors the appearance of twisting torsional torques in it, increasing fatigue loads on the components of the shaft.

The article proposes a control strategy for the WECS that reduces the amplitude of torsional torque oscillations and, accordingly, reduces the frequency and duration of WECS downtime in the event of damage or scheduled repair of the shaft.

*Key words: renewable energy sources, voltage source converter, PMSG, wind turbine, torsional oscillations, free vibrations, forced vibrations, damper, dynamic wind model, turbulent wind velocity oscillations.*