Impact of Conventional Wind Turbines on the Stability of Power Systems

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Abstract

Worldwide wind turbines have steadily increased. They are very different in nature from conventional generators.

Induction generators in large scale are used in wind turbines for their simple construction and reliable operation.

With the increase in penetration of wind turbines, the power system dominated by synchronous machines will experience a change in dynamics and operational parameters.

This paper aims to analyze the impact of induction generators on transient and small signal stability of power systems by gradually increasing the rate of power generated by wind turbines and changing the location of these turbines in the power system.

The obtained results indicate that both penetration level and the location of the wind turbines have strong influence on the rotor angle, on speed of synchronous machine (δ , ω), on bus bar voltages and consequently on the stability of the power system.

Keywords: Wind Turbines, Induction Motor, Small Signal Stability, Transient Stability, Critical Clearing Time.

For the Paper in Arabic see pages (29-50)

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