

عنوان مقاله:

Damping sub-synchronous resonance and improving fault ride through capability: Using S.T.A.T.C.O.M. and S.D.B.R. in a wind power system

محل انتشار:

دو فصلنامه تجهیزات و سیستم های انرژی، دوره 8، شماره 4 (سال: 1399)

تعداد صفحات اصل مقاله: 16

نویسندگان:

Ehsan Heydari - *Department of Electrical Engineering, Najafabad Branch, Islamic Azad University, Najafabad, Iran*

Ghazanfar Shahgholian - *Smart Microgrid Research Center, Najafabad Branch, Islamic Azad University, Najafabad, Iran*

خلاصه مقاله:

Concerning wind power penetration into power systems in recent years, the problems of incorrect operation of wind turbines include sub-synchronous resonance (S.S.R.) oscillations and fault ride through (F.R.T.) capabilities need to be fully considered and resolved. In this respect, the S.S.R. phenomenon can severely damage the rotor of an asynchronous generator in a compensated power system with capacitive reactance connected to a wind turbine. Therefore, active and reactive powers of the mentioned systems are controlled by static synchronous compensator (S.T.A.T.C.O.M.) and series dynamic braking resistor (S.D.B.R.); respectively. Moreover, power system designers combine them to improve system stability. In this study, an appropriate method was presented based on the genetic algorithm (G.A.) to provide coordinated and optimal control of STATCOM and S.D.B.R. in order to mitigate S.S.R. and enhance F.R.T. capabilities in a wind farm connected a power system. Optimization variable of this problem included resistance value of S.D.B.R., S.T.A.T.C.O.M. capability, along with its control parameters optimized simultaneously via G.A. to store kinetic energy in the rotor, to control voltage deviations of the wind farm bus, and to minimize speed deviations of the rotor. The proposed method was implemented on the Institute of Electrical and Electronics Engineers (IEEE) first benchmark model to verify the performance of its control structure. The obtained results indicated that coordinated and optimal combination of S.T.A.T.C.O.M. and S.D.B.R. could damp S.S.R. oscillations and augment system stability.

کلمات کلیدی:

Sub-Synchronous Resonance, Fault Ride Through, Optimization, S.D.B.R, S.T.A.T.C.O.M

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1221215>

