Title:	A Robust Virtual Inertia Control of Battery Storage System to Enhance Transient Stability of Grid System including Wind Farms
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Published Journal Name:	AIUB Journal of Science and Engineering (AJSE)
Type of Publication:	Journal
Volume:	19 Issue 3
Publisher:	American International University-Bangladesh (AIUB)
Publication Date:	Dec. 31, 2020
ISSN:	1608 – 3679
DOI:	https://doi.org/10.53799/ajse.v19i3.113
URL:	https://ajse.aiub.edu/index.php/ajse/article/view/113
Other Related Info.:	Page 135-142

Abstract:

With the rising penetration of modern converter-based wind farm (WF) into the existing grid system deteriorates system inertia due to reduction of the capacity of conventional power stations which may lead to the frequency instability as well as power system transient instability. In order to solve this concern, this paper presents a robust virtual inertia control approach for battery storage system (BSS) to enhance the frequency stability of the grid system after the generation failure owing to severe grid disruption. The control approach integrated inertial controller based on the rate of change of frequency (ROCOF) and droop controller according to frequency deviation. The impacts of the proposed virtual inertia controller (VIC) is confirmed through simulation analysis on a multi-machine power system with conventional power stations, permanent magnet synchronous generator (PMSG) with full converter based WF and squirrel cage induction generator (SCIG) based WF. Simulation study clearly demonstrates that by adopting both strategies, the BSS can effectively minimize the frequency nadir and steady-state error.

Keywords: Frequency stability, battery storage system, PMSG, SCIG, power system, virtual inertia.