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PARTIAL FEEDBACK LINEARIZATION APPROACH TO NONLINEAR CONTROL OF SYNCHRONOUS GENERATOR WITH TRANSIENT
MODE
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Universitas Gadjah Mada, 2024 | Diunduh dari http://etd.repository.ugm.ac.id/

ABSTRACT

Modern power systems are very complex and nonlinear, requiring high performance controllers to maintain system stability. This research presents the uses of nonlinear control called Partial Feedback Linearization (PFBL) in power systems to restore equilibrium when dealing with disturbances. The PFBL controller is used to guarantee small-signal and transient stability. The control law is calculated using the Linear Quadratic Regulator (LQR) method. The detailed transient model of synchronous machines and an IEEE Exciter Type-I are the models from which the control law is derived. Through the simulation of different disturbance in SMIB model and control using the PFBL controller, it proved that PFBL is an effective controller for averting instability in the power system. Because it is not based on a linear system, this nonlinear controller is also less sensitive to changing operations.

Keywords: Synchronous Generator, Power System Stability, Linear Systems, Nonlinear Control Systems, Partial Feedback Linearization.