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Robust Control of STATCOM Based on Sliding Mode Technique

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Abstract. This paper presents a robust controller for GTO based static compensators (STATCOM), which guarantees fast and stable voltage regulation under all operating conditions. The design of control system is based upon the Sliding Mode technique. The system is simulated in order to validate the controller performances. The stability of proposed composite controller is proved by Lyaponuv theory. The effectiveness and validity of the controller system is supported by computer simulation. Simulation results obtained, confirm that the controller is robust and stable against all of the parameters variations and uncertainties.

Key words: STATCOM, FACTS, Robust Control, Sliding Mode.

References

[l] L. Guygyi, "Reactive Power Generation and Control by Thyristor Circuits", *IEEE Transaction on Industry Applications*, Vol.15, No. 5, 1979.
[2] C. W. Edwards, K. E. Mattern, E. J. tacey, P. R. Nannery and J Gubernick, "Advanced Static VAR Generator mploying GTO Thyristors", IEEEIPES 1988.
[3] L. Gyugyi et al, "Advanced Reactive Power Compensator Using GTO for applications of Electrical Energy distribution", GIGRE 1990, Paris, France.
[4] Z. Yao, N. Lechevin "Issues on Nonlinear Control of Voltage Source Facts Devises", *IEEE Proc. On control applications*, 2005, Toronto, Canada.
[5] Jain, A.K. Behal, A. Zhang, X.T. Dawson, D.M.Mohan, N.: "Nonlinear controllers for fast Voltage regulation using STATCOMs*", IEEE Control Systems Technology*, Nov. 2004, pp. 827- 842, Vol. 12, No. 6.
[6] Z. Yao, M. S. Dawande and V. Rajagopalan, "Input-Output Linearization for Advanced Reactive Power Compensators", *PESC'97*, 22-27 June, 1997, pp. 936-41.
[7] Z. Yao, V. Donescu, P. Kesimpar, N. Léchevin,V. Rajagopalan, "Nonlinear Control for STATCOM Based on Differential Algebra", 1323 *IEEE Power Electronics Specialists Conference*-PESC'98, 17-22 May 1998, Fukuoka, Japan.
[8] A. Abbasian, J.Soltani "Robust Nonlinear Control of Linear Induction Motor taking into account the Primary End Effects", *IEEE Proc on Industry Applications*, Vol. 10, No. 6.