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Control Strategy Research of D-STATCOM Using Active Disturbance Rejection Control Based on Total Disturbance Error Compensation

In this project, to improve the performance of the Linear Active Disturbance Rejection Controller (LADRC), solve the coupling problem between the d-axis and q-axis current and improve the dynamic tracking response speed and anti-interference ability. A controller with LADRC that compensates the error of the total disturbance is proposed, and the stability of the improved frst-order LADRC is proved by the Lyapunov stability theory. Then the output of the full interference channel is corrected to improve the anti-interference ability of the system and the interference observation ability of the Linear Extended State Observer (LESO) to high frequency noise. Through the analysis of the Bode diagram in the frequency domain, compared with the traditional LADRC, the improved LADRC proposed in this paper has better anti-interference performance. Finally, the improved first-order LADRC is used to replace the traditional D-STATCOM control strategy for current inner loop control, which effectively reduces the disturbance observation error of LESO. The simulation results show that the improved LADRC control performance is better than the Proportional Integral (PI) controller, and it has better tracking performance and anti-interference performance.

Domain: Power Systems _ Hybrid Systems
Technology: Electrical