

Minimizing of current harmonics for electrical power system station by controlled current source

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Abstract:

In this optional method, controlled current source CCS with controlled voltage source CVS is used to increase the high power system station acts. The traditional system causes high odd and even harmonics for current and voltage that it leads to decreasing the system efficiency. The output sinewave voltage and current is distorted with more unstable. Therefore, the best solution for this critical situation, CCS with CVS controller are used to develop the efficiency by reducing the steady state error, decreasing the overshoot with undershoots for system. The results are completed depending on Matlab Simulink with toolbox. The system with two controllers has the consultant over conventional system with increase the active power and minimizing losses power by limitation the harmonics.

Key words: power system station, CVS and CCS controller, current and voltage harmonics, Matlab.

Introduction:

High power system stations are the main power for distribution and transmission power from the electrical generation system. These distributed stations have many problems to solve it to enhance the active power [1]. Therefore, the quality of power is suggested by some author to increase the efficiency [2] [3]. In addition, the harmonics is growing because of divergence between the frequency of signal with voltage supplied to system. The active power is projected by expansion control approach to optimize efficiency [5]. The authors in [6] reported simple method that focusing on active power. Multiple adjustable current is recycled to enhance the harmonics of current [7]. Also, the shunt active filter is established to enhance the system of power station [8]. A hybrid technique based power filter and thermistors are also presented [9]. The passive and active filters are applied to power station to augment the system [10]. Lastly, current control is created to adjustable the voltage and frequency deviation by using advancement method [11] [12]. In this method, new contribution is optional to increase the reliability of power station based on controlled voltage and controlled current sources. The main advantage of controller is to track the output current and voltage with input source.

Simulation Results:

In this method, the inputs to controller are output voltage and output current. The Simulink of CCS with CVS is shown in figure 1.

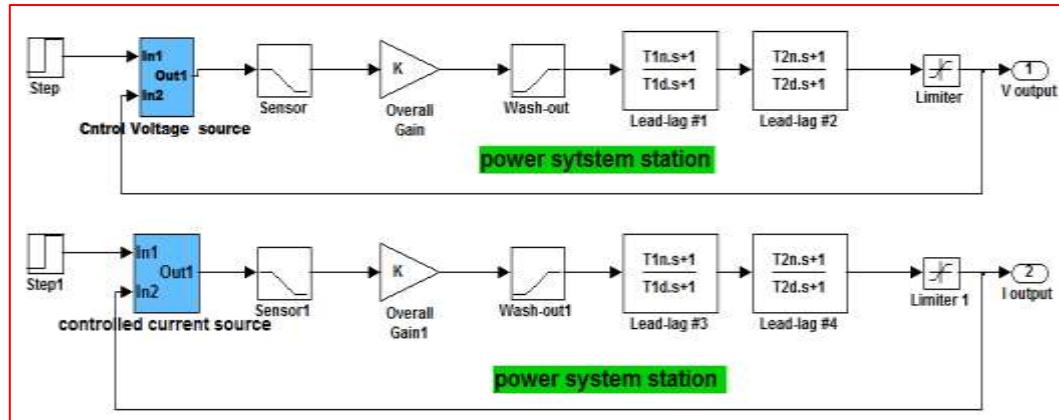


Figure 1: Simulink of CCS and CVS.

The harmonics of voltage and current in the classical power system station under the loads is very high s shown in figure 2 and figure 3 respectively.

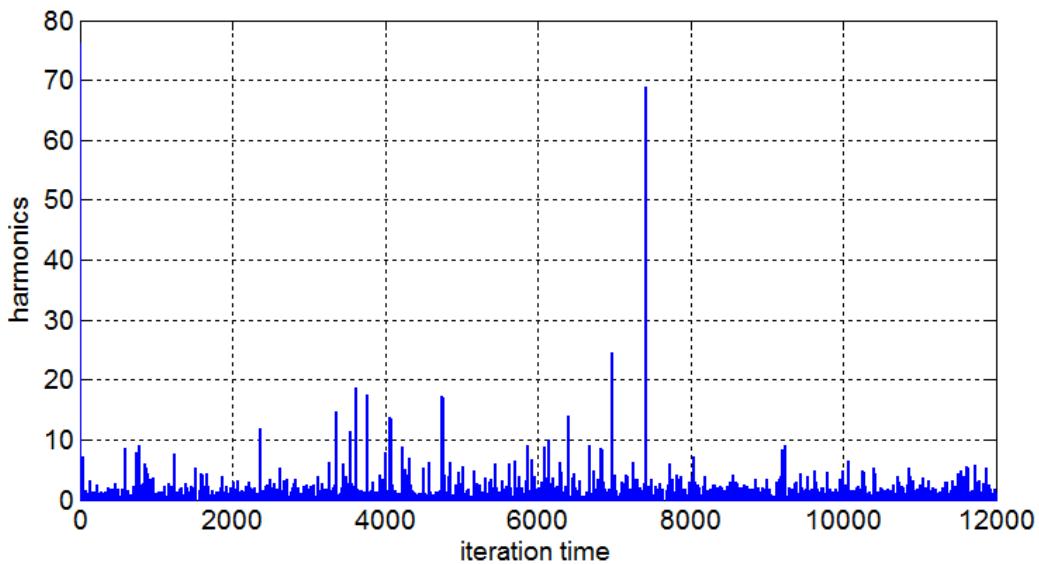


Figure 2: harmonics of current.

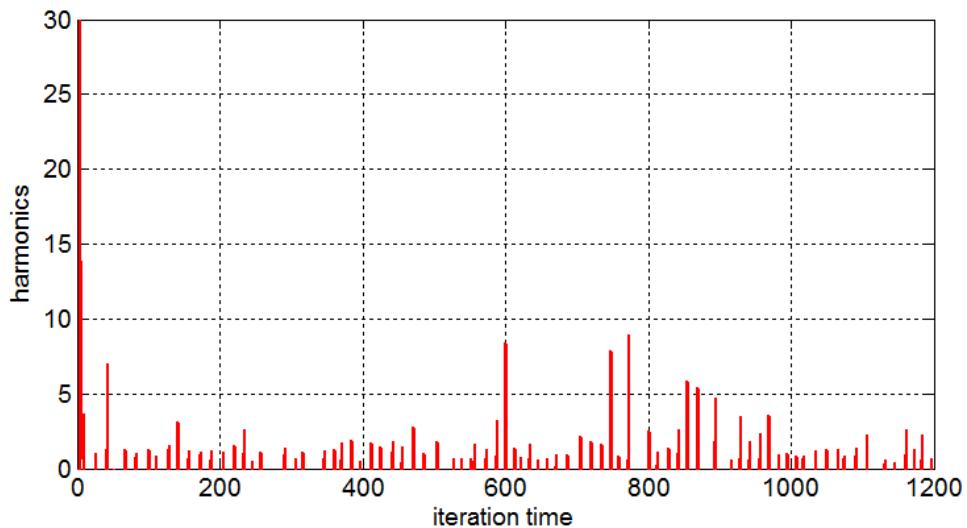


Figure 3: harmonics of voltage.

In figures 4 and figure 5. When the proposed CCS and CVS are used together in power system station, the harmonics is decreased and reach to zero .

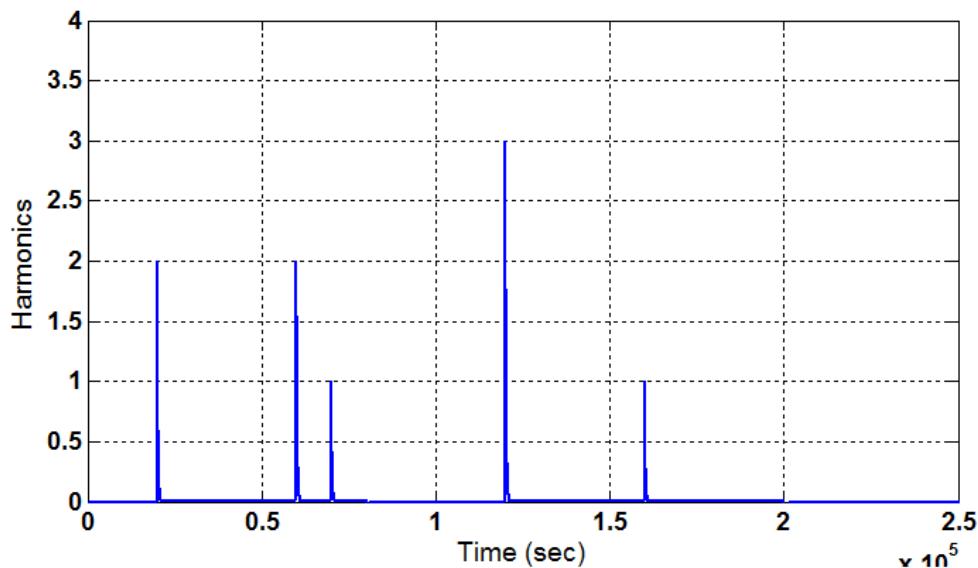


Figure 4: harmonics of current by using CCS

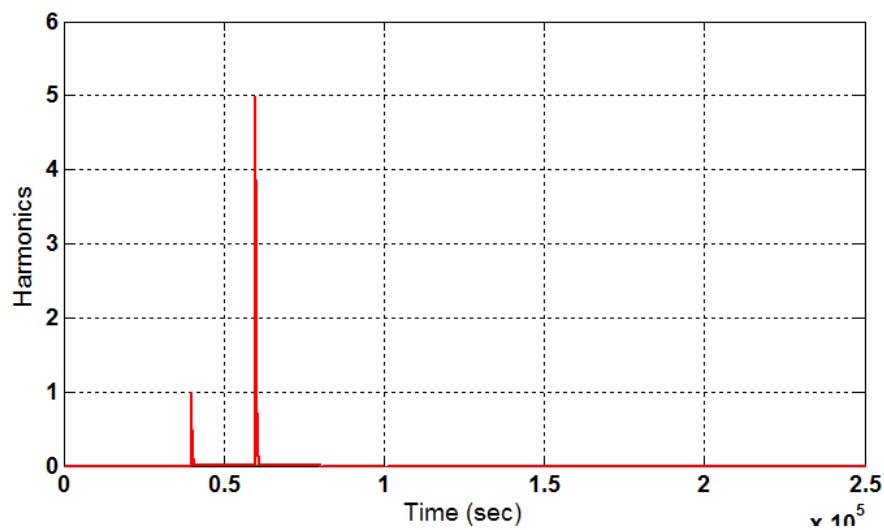


Figure 5: harmonics of voltage by using CVS

Conclusion:

In this method, the CCS and CVS are used to minimize the error between the desired and real output for voltage and current as results to make the system of power station is more reliability and high accuracy for optimize efficiency. Therefore, the losses of copper and iron losses of system will decrease. The target of this method is to make the system fast response and good tracking with input source. Finally, the power station with CCS and CVS is rigged, tough and high ability to control the voltage and current.

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