

Fig.14. Reference and Injected Currents of the First Phase for the Hysteresis Control

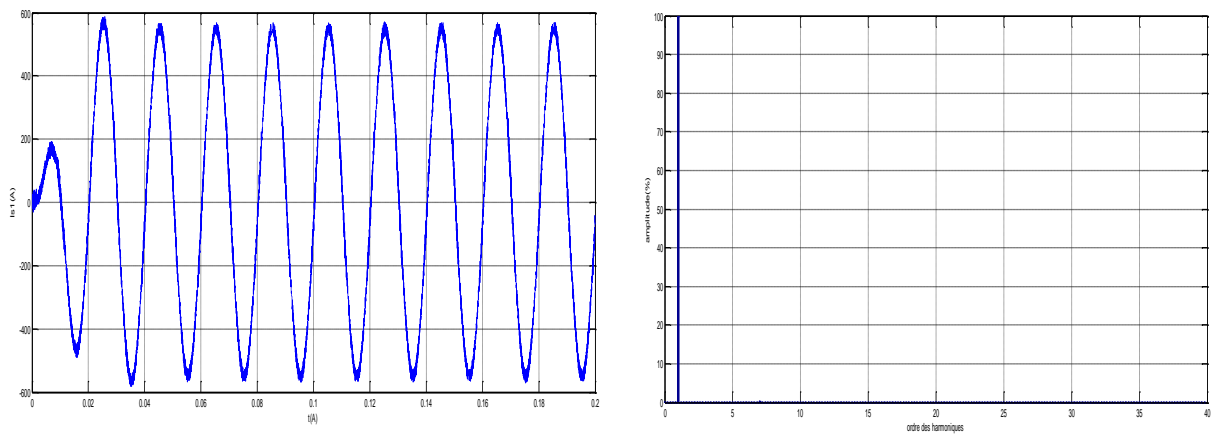


Fig. 15. Source Currents after Filtering and Their Frequency Spectra for the Hysteresis Control

b. MLI control strategy using the method (SRF)

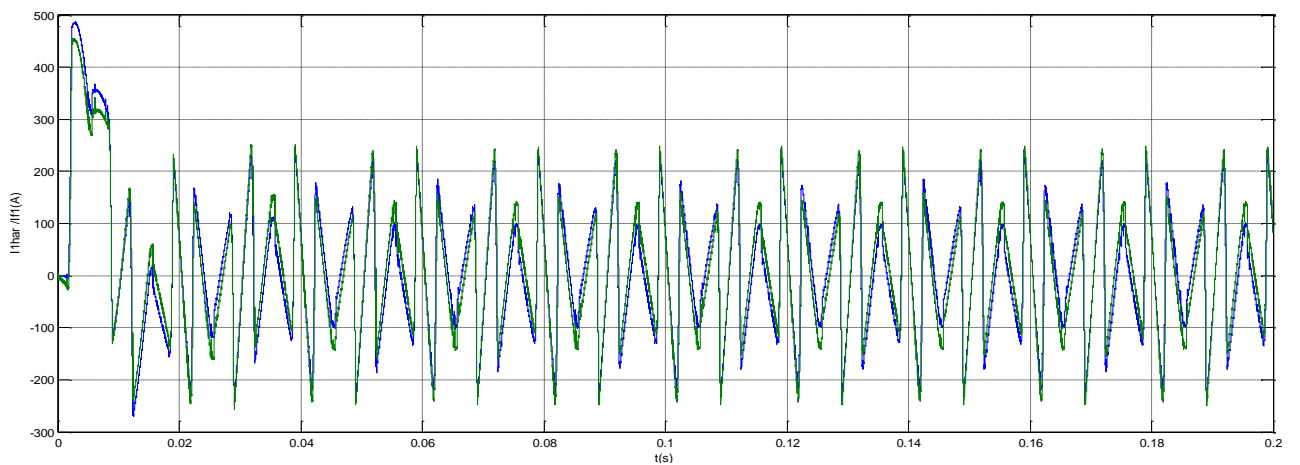


Fig. 16. Reference and Injected Currents of the First Phase for the MLI Control

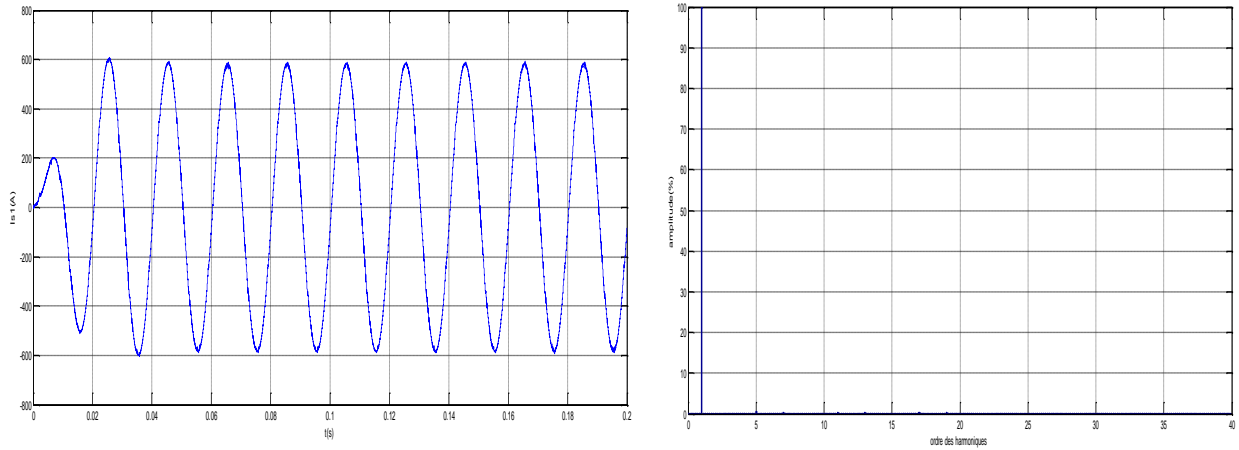


Fig. 17. Source Currents after Filtering and Their Frequency Spectra for the MLI Control

c. Vector MLI control strategy using the method (SRF)

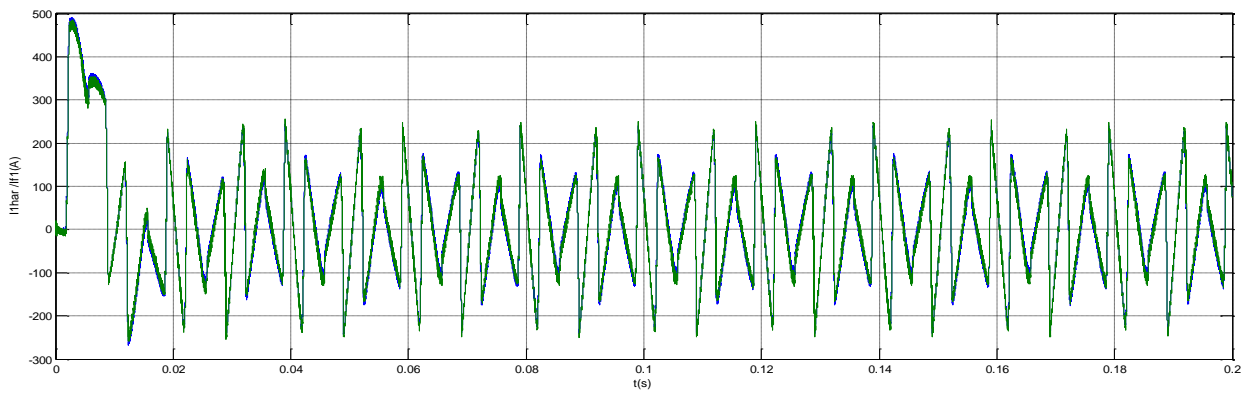


Fig. 18. Reference and Injected Currents of the First Phase for the Vector MLI Control

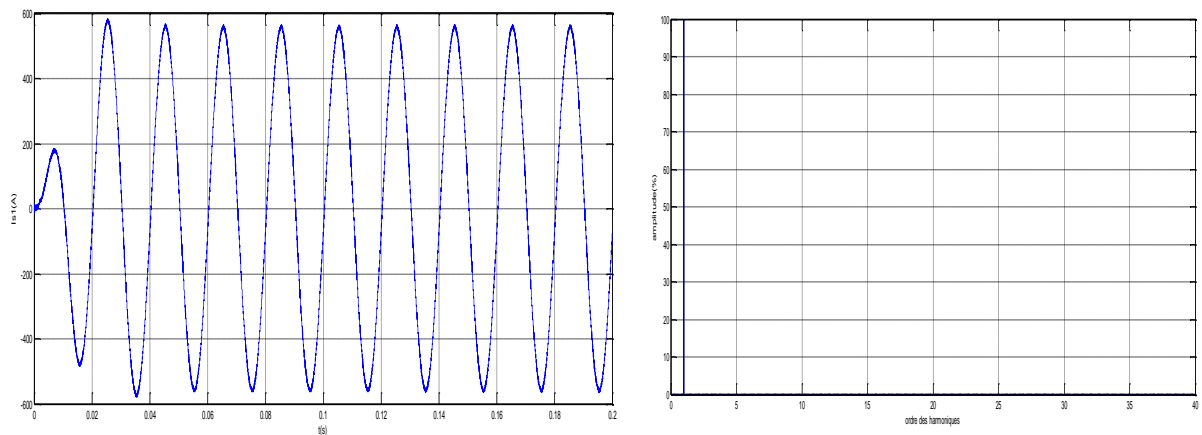


Fig. 19. Source Currents after Filtering and Their Frequency Spectra for the Vector MLI Control

7. Results Interpretation

7.1 Interpretation of Results for the Instantaneous Power Method

Figures (6) illustrate the line currents and their frequency spectrum, it is noted in the latter that the line currents have a rectangular shape this is due to the non-linear load and their frequency spectrum of the line currents Presents the presence of several harmonics tell that are $THDI = 25.75\%$

The figures (7) show that the frequency spectrum of the identified currents coincides with the Spectrum of line currents except for the presence of a fundamental component in the latter.

The figures (8), (10) and (12) show respectively the reference current and injected for the first phase for the hysteresis control, MLI and Vector MLI, which means that if our inverter can inject a current following its reference, we will have a current of sinusoidal source.

Figures (9) show the source currents after filtering and their frequency spectra for hysteresis control, there is an improvement in the quality of the currents and reduction of the $THD = 1.76\%$.

The figures (11) show the source currents after filtering and their frequency spectra for the MLI control, one notices an improvement of the quality of the currents and reduction of the $THD = 1.25\%$.

Figures (15) show the source currents after filtering and their frequency spectra for Vector MLI control, there is an improvement in the quality of the currents and reduction of the $THD = 0.85\%$.

7.2 Interpretation of Results for the Method (SRF)

The figures (14), (16) and (18) respectively show the reference current and are injected for the first phase by the hysteresis control, MLI and Vector MLI, which means that if our inverter, can inject a current following its reference, of sinusoidal source.

The figures (15) show the source currents after filtering and their frequency spectra for the hysteresis control, there is an improvement in the quality of the currents and a reduction of the $THD = 1.65\%$

The figures (17) show the source currents after filtering and their frequency spectra for the MLI control, there is an improvement in the quality of the currents and reduction of the $THD = 1.01\%$.

Figures (19) show the source currents after filtering and their frequency spectra for Vector MLI control, there is an improvement in the quality of the currents and reduction of the $THD = 0.78\%$

Conclusion

From the results obtained by the simulation made under the same operating conditions of the FAP next two proposed methods, the component method reference related to the timing with MVF and method of instantaneous active and reactive power with MVF detected disruptive current successful they effectively reduced the THDi after compensation, we found that the FAP Vector MLI control method gave satisfactory results and slightly better than the hysteresis and PWM method.

The results obtained with the two commands show that the implementation of the active filter can significantly reduce the harmonic content of the current source, which results in decreased after filtering THD well below 5%.

References

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