Single-phase active filter based on Conservative Power Theory – CPT with digital control

The Fig. 1 presents the simulated topology.

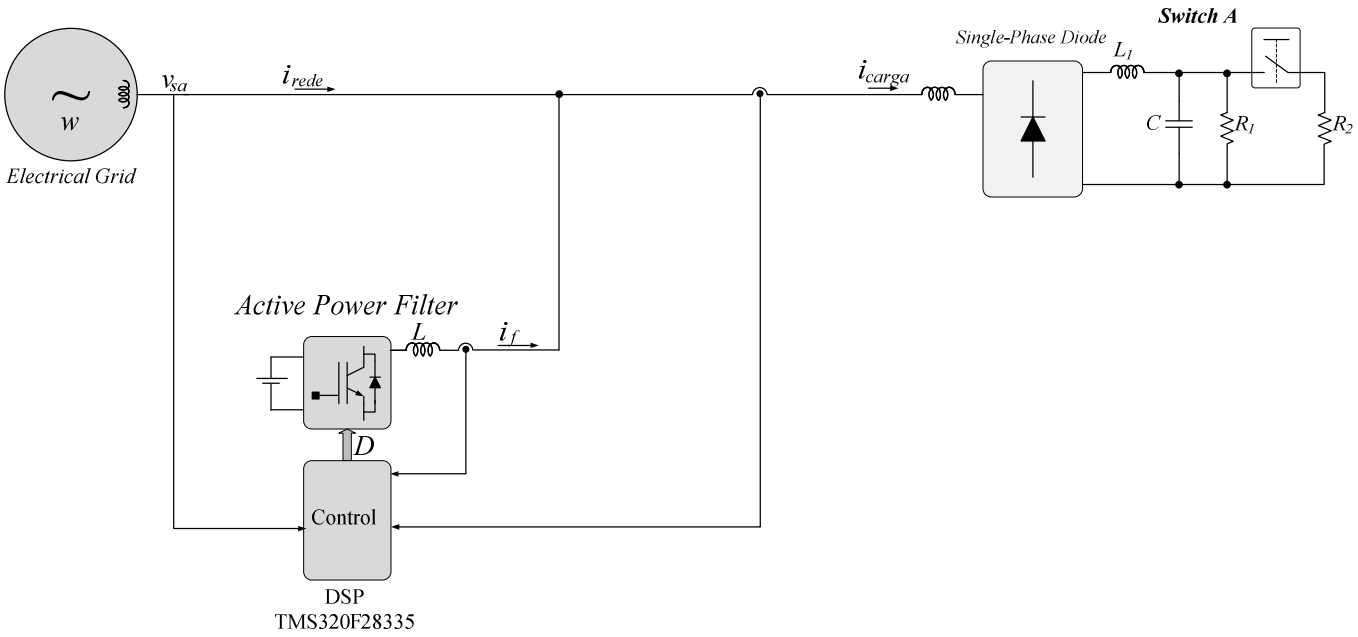

Figura 1: Simulated Topolgy.

The Fig. 2 presents the control block diagram. A complete understanding of the CPT (Conservative Power Theory) may be found in [1]. The details of the Current Plant and the Digital Current Controller are found in "Active Filter based on CPT - Digital Controller Design.pdf".

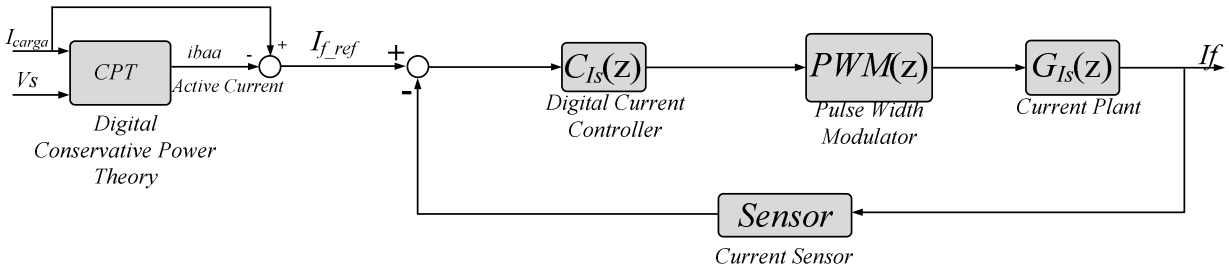

Figura 2: Control block diagram.

The CPT block output signal is the active current consumed by the load. Mathematically, this current is obtained by (1.1) [2].

$$i_{baa} = \frac{\langle V_s \cdot i_{carga} \rangle}{\|Vs_{rms}\|} \tag{1.1}$$

The Fig. 3 presents the simulated power circuit. (High Resolution Figure – Make a zoom for details)

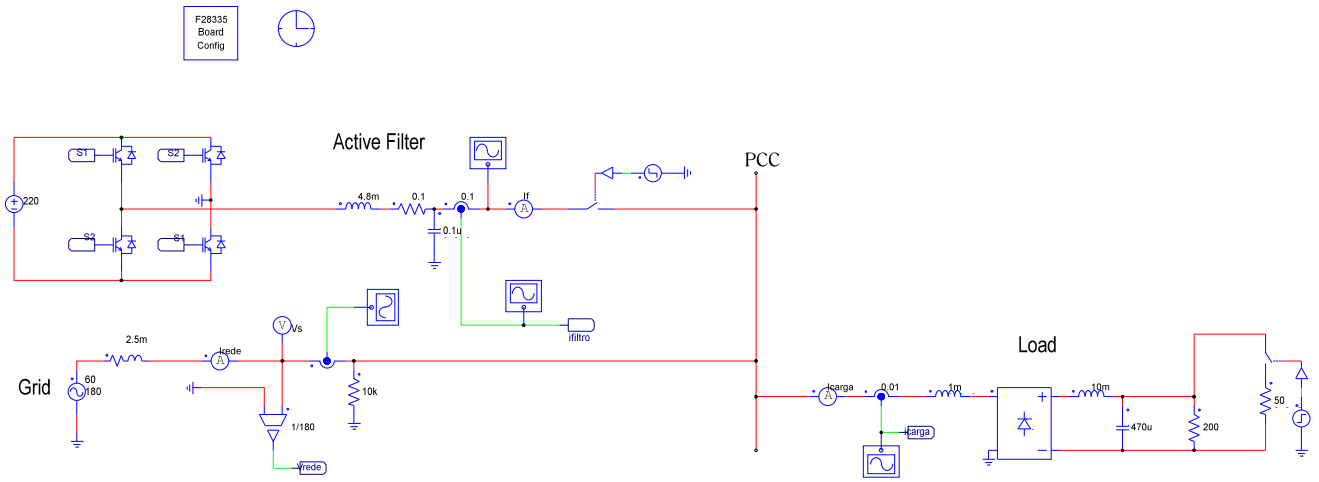

Figura 3: The simulated power circuit.

The Fig. 4 presents the Simulated Control Circuit (Code Generation). (High Resolution Figure – Make a zoom for details).

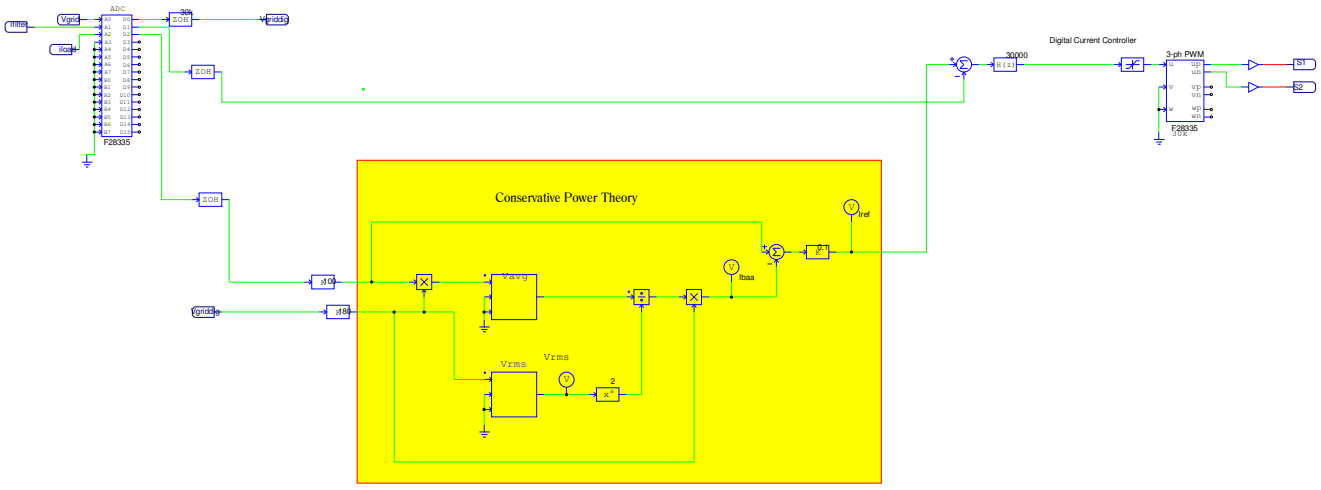

Figura 4: Simulated Control Circuit.

References:

[1] P. Tenti, H. K. M. Paredes, P. Mattavelli, “Conservative Power Theory, a Framework to Approach Control and Accountability Issues in Smart Microgrids”, IEEE Transactions on Power Electronics, vol. 26, no. 3, pp. 664-673, March 2011.