

Digital Power Factor Correction. Recent approaches with and without current sensor

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Abstract— The impact of digital signal processing techniques applied to the design of controllers for power factor correction stages is reviewed. The analyzed contributions are oriented to eliminate or simplify the circuits that acquire and filter the converter variables as well as to improve the noise immunity and dynamic response. They are classified into two groups. The first group includes a current sensor. The second group faces the elimination of the current sensor for operation in continuous conduction mode, thus the duty cycle is defined by inaccurate estimation algorithms that limit the scope of application in which acceptable power factor is achieved. The paper puts especial emphasis on the latest authors' original proposals that result in a universal controller, i.e. with no input voltage amplitude or frequency nor load limitations as long as the converter operates mostly in continuous conduction mode. The final aim is to specify a digital controller to be integrated in a field programmable gate array or in a specific circuit. Experimental results are presented as a proof of concept of the proposal.