

Abstract

The proposed paper aims to analyse the control saturation phenomenon and its influence on the steady state converter performance. This analysis is performed for two main targets:

1) Rating AC line inductors, while fulfilling the compromise between a minimal value required to limit main currents ripple at used switching frequency, and a maximal value that maintains the current modulation capability and consequently limits the control saturation phenomenon,

2) Tuning the digital controllers parameters, in order to reduce control saturation on the one hand, and ensure low Total Harmonic Distortion (THD), unity Power Factor (PF) and regulated split DC bus voltages on the other hand.

The obtained results clearly show a fundamental dependency between the saturation angle, voltage unbalance controller parameters, and both line inductors size and required output load power.