

## **Detailed analysis of closed-loop control of output-voltage harmonics in voltage-source inverters**

A. García-Cerrada, P.L. Roncero-Sánchez, P. García-González, V. Feliú

**Abstract—** This paper investigates the design and application of selective controllers for voltage-source-inverter output control. These controllers can be applied to minimise the effects of the inverter dead times on output-voltage harmonics or to provide flexible control of the inverter low-frequency output-voltage harmonics. The paper investigates the closed-loop stability of the resulting systems thoroughly and explains the controller design process from the frequency-response viewpoint. It is clearly demonstrated that a compromise has to be reached between transient-response speed and tracking (or rejection) accuracy.

The main contributions of the paper are illustrated with a prototype where the two applications proposed for this type of controllers are tested.

**Index Terms—** Voltage-source inverters, selective harmonic elimination, closed-loop control, inverter output voltage

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