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A varying frequency LPV-based control strategy for three-phase inverters

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Abstract-

Grid-connected inverters have drawn a lot of attention in the integration of distributed generation systems and microgrids, as they are an effective interface for renewable and sustainable energy sources. Several strategies, including repetitive and resonant controllers, have been implemented in order to achieve low distortion and high-quality power. However, it has been proved that their performance decreases substantially when the grid frequency varies. This paper proposes a resonant control strategy based on a linear parameter varying (LPV) design, which is able to deal with changes in the network frequency. Controller aim is associated with injecting a clean sinusoidal current to the grid, even in the presence of nonlinear/unbalanced loads and/or grid-voltage distortions. Main emphasis is focused on presenting an applied LPV design procedure that covers plant modeling, controller synthesis, stability analysis, and experimental results that show the feasibility and effectiveness of the proposed scheme.

Index Terms- Distributed generation, frequency variation, linear parameter varying (LPV)-based control, voltage source inverters.

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