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Three Phase Multi-Level Inverter Topologies and Modulation Techniques

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Abstract

- To mention the vital role of power electronic converter in the power production domain
- The paper reviews methodologies to control **three-phase multi-level Inverter** by PWD control techniques
- Proposal **three-phase multi-level Inverter topologies** and **Modulation Techniques**
- comparison among PWM control techniques **phase disposition (PD)**, **phase opposite disposition (POD)**, and **alternate phase opposite disposition (APOD)**
- Analysing **THD** and **common mode** between methodologies

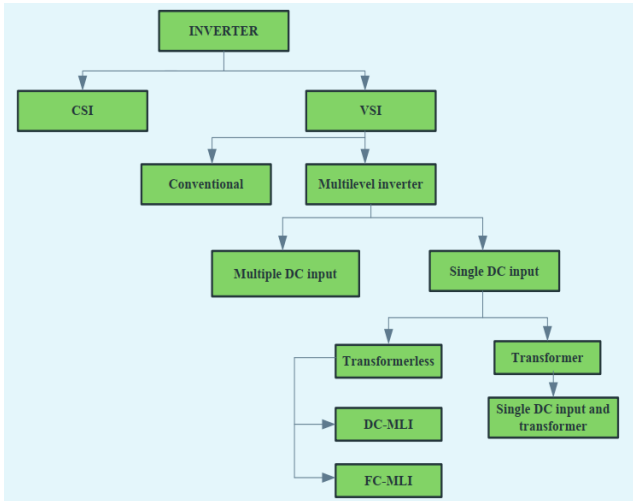
Reference Papers

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- Anup Kumar Panda.: Yellasiri Suresh.: Research on cascaded multilevel inverter with single DC source by using three-phase transformers. Electrical Power and Energy Systems. no 40, pp. 9–20, 2012.
- Suresh.Y., Panda A.K.: Research on a cascaded multilevel inverter by employing three-phase transformers. IET Power Electron., Vol. 5, no. 5, pp. 561–570, 2012
- R. Gonzalez, E. Gubia, J. Lopez, and L. Marroyo, "Transformer less single phase multilevel-based photovoltaic inverter," IEEE Trans. Ind. Electron., vol. 55, no. 7, pp. 2694–2702, Jul. 2008

Review Objective

- Three-Phase multi-level Inverter
 - Diode clamped Inverter
 - Flyting capacitor Inverter
 - Cascaded H-Bridge Inverter
- Single DC source with single phase transformer H-Bridge (topology 1)
- Single DC source with single phase transformer H-Bridge (topology 2)
- Modulation techniques
 - phase disposition (PD)
 - phase opposite disposition (POD)
 - alternate phase opposite disposition (APOD)

Introduction about three-Phase Inverter



Introduction about three-Phase Inverter

- The three-phase converter include voltage source Inverter (VSI) and current source Inverter (CSI)
- voltage source Inverter (VSI)
 - fundamental three-phase Inverter with 2 level
 - multi-level three-phase Inverter (3, 5, or 7 level)

Three-Phase multi-level Inverter with Diode clamped Inverter

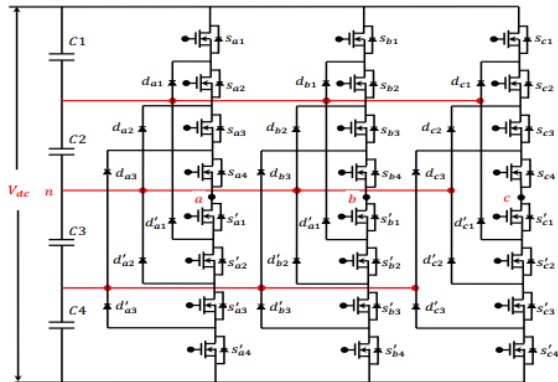


Fig. 2. Diode clamped inverter

Three-Phase multi-level Inverter with Flying capacitor Inverter

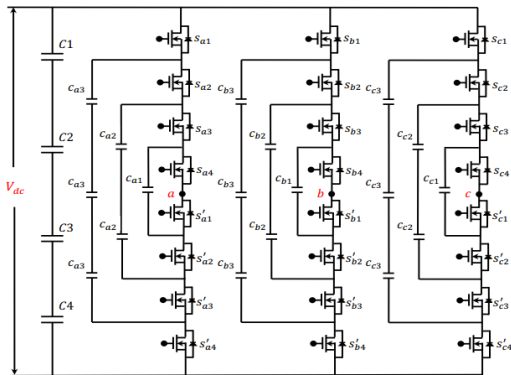


Fig. 3. Flying capacitor inverter

Single DC source with single phase transformer H-Bridge (topology 1)

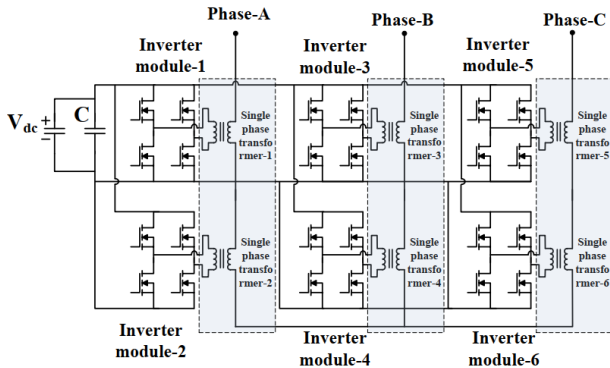


Fig. 5. Single DC source with single-phase transformers H-Bridge (Topology 1)

Single DC source with single phase transformer H-Bridge (topology 2)

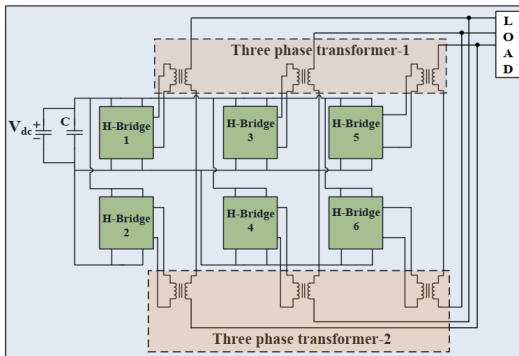


Fig. 6. Single DC source with three-phase transformer H-Bridge (Topology 2)

Modulation techniques

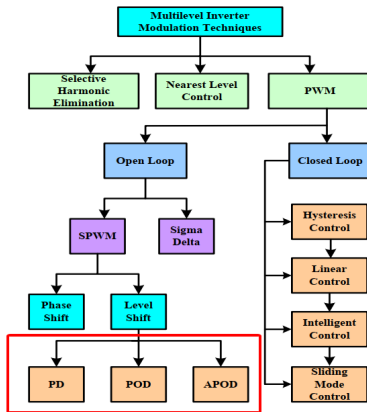


Fig. 9. PWM techniques and control methods

Diode clamped Inverter

Content

Content

Thanks for your attention