ŁOTWA SYSTEM

LCL three-phase grid-connected inverter

Overview

This paper presented the design methodology for an LCL filter used to interface between three phase power converter and the main utility grid. The main objective of the LCL filter is to attenuate the switching frequenc. This paper presented the design methodology for an LCL filter used to interface between three phase power converter and the main utility grid. The main objective of the LCL filter is to attenuate the switching frequency current harmonics produced by the power converter. A simple, comprehensive and systematic design methodology for the tuning of LCL.

The objective of this paper is to propose a simple, less intuitive and systematic design methodology for the tuning of LCL filter parameters. The considered design methodology takes into account the LCL filter topologies, which can be based either on wye or delta connected capacitors. The advantages and drawbacks of each topology are discussed in order to achieve an optimal design. The obtained filter parameters have been firstly tested using Matlab-Simulink software tool. After that, they have been tested through an experimental set-up. The obtained simulation and experimental results show the performances and effectiveness of the proposed design methodology.••.

Nowadays, high price, lack and polluting effects of fuel sources make them less and less attractive solutions to generate electrical power. For these reasons, electrical power generation based on renewable energy sources (like photovoltaic systems, wind turbine systems, biomass units.) becomes one of the biggest concerns of our time [1], [10], [11], [19]. Moreover, this kind of electrical power generation does not harm to the environment and its cost will decrease in the near future. The power generated through renewable energy sources is conditioned by grid connected power converters [17], [6], [23]. These power converters are usually associated to high order filters such as LCL filters in order to meet standards and grid code requirements [4], [22]. The common use of LCL filters i.

The power circuit of a three phase grid connected power converter is presented in Fig. 1. As depicted in this figure, the LCL filter is used to interface between the power converter and the grid. Vi(a,b,c) (respectively ii(a,b,c)) refer to the components of the output power converter voltage vector (respectively the components of the output power converter current vector) in the stationary reference frame, while Vg(a,b,c) (respectively i2(a,b,c)) refer to the components of the grid voltage vector (respectively the components of

the grid current vector) in the stationary reference frame. L2 (respectively Li) refer to the grid side inductor of the LCL filter (respectively the converter side inductor of the LCL filter), while R2 (respectively Ri) refer to the internal resistance of the grid side induct.

For the design of an LCL filter, some input data are required. These data are the rated active power of the system Pn, the line-to-line RMS grid voltage Ugn, the switching frequency of the converter fsω and the rated angular frequency of grid voltage fg. Then, the LCL filter parameters in case of wye topology are tuned according to the following st.

Can an LCL filter be optimized for grid-interconnected onverters?

essary to implement an optimized design for the LCL filter. This document introduces a study on the modelling and design methodology of an LCL filter for grid-interconnected onverters, employing an analytical approach. The simulation results demonstrate that by employing this design methodology, t ere is a reduction of 98.51% in the current ha.

Can an LCL filter control a grid connected power converter?

Therefore, based on what has been said, it is advantageous to control a grid connected power converter with an LCL filter with a delta connected capacitors. Fig. 8 shows the algorithm that summarizes the steps of the proposed LCL filter design methodology.

How is a three phase grid connected VSI with LCL filter developed?

A mathematical model is developed using the power circuit of a three phase grid connected VSI with LCL filter. The three phase power circuit is reduced to a single phase equivalent circuit and the transfer function of the LCL filter derived using the circuit parameters.

What is three phase inverter circuit modeling connected to grid?

Three phase inverter circuit modeling connected to grid is Production System given in figure 1. (REPS) applications such as wind turbines, solar energy systems, fuel cells have increased . The REPS is connected to the grid system via the inverter.

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