Wind Energ. Sci. Discuss.,
https://doi.org/10.5194/wes-2020-27-RC1, 2020

WESD

Interactive comment

Interactive comment on "Demonstration of Offshore Wind Integration with an MMC Test Bench featuring Power-Hardware-in-the-Loop Simulation" *by* Fisnik Loku et al.

Anonymous Referee #1

Received and published: 13 April 2020

General comments

The articles topic is relevant to the journal, however, lack scientific rigours. The HiL implementation of MMC has been studied in many previous articles, with details about the challenges on HiL implementation and connection. As a discussion paper this doesn't goes beyond that level of technicality and in reviewer's opinion the contribution is not clear.

Technical comments

Another issue is the lack of demonstration with respect to dynamic cases (fault cases), which is of interest from the connection or operational point of view. Whether the

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Discussion paper

current state of the PHiL is sufficient enough to reflect the transient studies is not addressed. This is a short coming.

PHiL interface is touched upon with emphasis on used approach, however, the design criterion for filters, scaling methods etc could have been discussed in more detail. This could facilitate a clear discussion and understanding on the issues related HiL implementation when connecting devices operating at two voltage levels through a power amplifier.

Another question is related to the AC system implementation, it is not clear how the AC system is modelled in the RTS. Is it a source behind impedance or is it with multiple buses, please elaborate?

The schematic shown is Fig.3-5 are confusing, for instance, where is the DC network implemented hardware or RTS, similarly what is it inside the RTS which represents a wind turbine, what are the details of the WT test system inside RTS. A high-level hardware implementation with components representation could help the readers.

The authors also discuss on the ITM interface and its suitability for facilitating hardware connection to RTS, for strong grid from a stability point of view. The question will be how this interface performs for weak grid connection and what adjustments are needed to be considered to facilitate a stable PHiL connection.

The design of filters and associated delays in Interface algorithms is an important aspect to ensure stable HiL operation, as shown in Fig 6. However, detailed filter design for the demo experiment has been not taken into consideration.

The results for steady-state power flow models does not sufficiently demonstrates the HiL operation in reviewer's opinion. This is particularly interesting when the power flow is not reaching the full capacity, currently reaching inly at 0.3 p.u. 1/3 of the capacity of the device (see Fig 10). The comparison needs to be performed at 1 p.u. to see the differences between simulation and experiment and measurement errors.

As indicated earlier, more results especially on transient cases could of interest to scientific community.

The references to prior work are not sufficient for a topic of such interest. More academic papers should be included to identify the issues and solutions related to PHiL implementation (only one journal paper out of 16 is not sufficient enough.

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