

Interactive comment on “Comparison of HiL Control Methods for Wind Turbine System Test Benches” by Lennard Kaven et al.

Anonymous Referee #1

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The article proposes to assess different methods in the implementation of HiL for test benches. Very little information is provided on the drivetrain being tested or the wind turbine that is modeled. Also there are limited details provided on the implementation of each of the controllers. So the results presented in this article are not reproduceable. Further an evaluation of three standard control approaches on an unspecified system or plant is not novel and it is not justified for publication in its present state. Specific areas of the article that needs improvement are the following:

- 1) The abstract needs to be re-written to clearly articulate what novelty has been investigated and what was found. 2) Page 2, line 35: "Only with a Hardware-in-the-Loop (HiL) control method that reproduces the WTs inertia.....". Please define what aspects of the control system do you define as HiL and whether it operates on a realtime plat-

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form? 3) The introduction seems to heavily rely on prior publications by one or more of the authors of this article. The references should be broadened to include other relevant publications in the field. 4) Page 3, line 71: How do you quantify the inertia difference between WT and STB? Do you need to have the aeroelastic model of the turbine from the manufacturer? 5) Do you only model torsional inertia of the drivetrain or is bending inertia also considered? 6) Page 4: Line 80: What are the desired WT eigenfrequencies that you seek to represent in the MRC model and where are they shown? 7) Page 5: What is the sampling frequency and time step for equation 1 ? 8) Page 5: How do you determine the Lambda parameter and how do you ensure convergence to the required rotor speed? 9) The Bode plots (fig 6 and 7) do not seem to capture the WT behavior, but perhaps this is because of the specifics of the implementation of the methods? 10) Page 7, line 122: "turbulent wind conditions at 20 m/s...". The methods outlined mention generator torque control. It is not clear how the effects of pitch control on the rotor aerodynamics was accounted for? 11) It is unclear what Figure 8 is comparing. The legends on the left do not match the plots. 12) Figures 9: It is not clear why generator speed PSD is focused on as the only result for validating WT dynamics. At 20 m/s mean wind speed, the generator speed should not show high variations so long as the wind speed stays above rated? Why are there no plots shown at 7m/s or 9m/s etc where there will be a variation in generator speed based on the torque control? Also what about other system responses such as shaft loads? 13) Stated conclusions such as the "excitation of frequencies may be a result of the ill-tuned damper" and " MPC method constitutes a promising alternative for validation" seem to be very non-specific and hardly convincing.

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