A review on "Iterative feedback tuning of wind turbine controllers"

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Comments

The paper addresses an interesting topic on tuning (or fine-tuning) of wind turbines in operation. As it is correctly mentioned in the paper, three factors (or probably more) affect the performance of a controller designed for a simulation model, when implemented on an actual wind turbine. **1)** Model discrepancies due to modeling errors and/or manufacturing errors, **2)** The characteristics (in this case dynamics) of a wind turbine changes over time and therefore the controller needs to adjust to the new dynamics.

1) In this paper, the IFT is not used to tune a controller and track changes of the wind turbine, rather it is used to tune a controller and compare it against a base-line controller. I think it adds to the value of the paper to also support the second claim. It'd be interesting to induce some changes in the dynamics of the wind turbine and let the IFT re-tune the controller to the new changes. This can be for example changes in the aerodynamics of the blades due to e.g. leading edge erosion etc.
2) I might have missed it, but how do the authors support the first claim that the IFT method is re-tuning the controller for model discrepancies. In fact the controllers are implemented on the same simulation model. It would be interesting to test the algorithm on a simulation model whose characteristics are different from the design model (introducing some modeling/ manufacturing errors into account) and then let the IFT re-tune the controller for a better performance.
3) Is it relevant to check stability of the system when IFT is used for tuning? The authors have mentioned that they have not encountered stability issues, but does it guarantee that the system will stay stable?
4) The controller for the drive-train damper does not show significantly improved results over the base-line controller and the implementation of IFT on the pitch controller improves performance for set point tracking.
5) The band-pass gain in figure 9 does not seem to converge during the experiment. The same goes to some other parameters that are adjusted by IFT.
    a. What could be the reason for that?
    b. In general it doesn't seem that the parameters converge to a steady state value after 6000s of simulation. Shouldn't they finally converge?
    c. The parameters of the simulation model haven't changed, so shouldn't the parameters of the controller finally settle to specific values?
    d. Doesn't this raise an issue with stability of the method?

6) It is mentioned that the pitch controller is designed for step response tracking. It is known that wind turbine controllers in the full load region are designed for disturbance rejection with, rather than set-point tracking. So, the following questions arise:
    a. Is it relevant at all to design a wind turbine controller for step response tracking of the rotational speed?
    b. What's the applicability of set-point tracking for a wind turbine controller?
    c. What about the performance of the controller for disturbance rejection? What is the effect of re-tuning the controller for set-point tracking on disturbance rejection performance?
    d. Even if we are to improve performance of the wind turbine controller for set-point tracking, wouldn't it be easier to use a 2-DOF controller instead, so that we are not sacrificing the important disturbance rejection performance?
    e. Following the point mentioned above, it'd be better to compare a controller designed for set point tracking (design using IFT), against the same type of controller (e.g. a tuned 2-DOF wind turbine controller).
7) The same issue with convergence of the controller parameters exists for the pitch controller. It seems that the Ki of the PI controller is not converging to a specific value after over 5000s simulation time.

Minor comments

1) It'd be better to explain more clearly in the abstract that this algorithm is in fact an online tuning method.
2) In page 14, line 12 the authors mention "an inverted notch filter." Does this mean a band-pass filter?