Review - Load Reduction for Wind Turbines: an Output Constrained, Subspace Predictive Repetitive Control Approach

Torben Knudsen, Aalborg University

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Summary

This paper is well written with good contributions. The methods and mathematics are very involved. On the one hand this is impressing but on the other it raises the question whether the same results could be achieved by simpler methods as also pointed out by Ervin Bossanyi. It could improve the paper if the authors elaborated on this issue. Another question is what role and impact the adaptivity in the data driven modeling has for the results. I recommend publication after corrections and revision.

Specific comments

1. P1 In the introduction the IPC approach is very much motivated by application in wind farms. As discussed in e.g. Knudsen et al. [2015] some of the promising wake control methods are active yawing or IPC for wake redirection. Please explain how your solution fits into this kind of farm control.

2. Figure 2. This figure is not so clear when seen initially. What does the coloring mean. What does the gray block with U_f^+ mean etc?

3. P7

   (a) "where P is the period of the disturbance, equalling to the blade rotation period" Then the sampling time must be an integer of P which is changing all the time! How do you solve that?

   (b) The paper says "Then the effect of the periodic blade loads d_k on the input-output system can be eliminated as it holds" What does "as it holds" mean? This must be due to assumptions or definitions? Please explain?

4. P8

   (a) In (8) I guess it should be λ^{k-i} ?

   (b) Please explain how the "persistent exciting signals" are chosen?

5. P11 Line 215 Why is the dimension of $\bar{A}$ $12l$? Maybe it is so but it is not clear to me.

6. P14 TI for LC 1-3 is stated as 0 in table but 6 in text!

References

T. Knudsen, T. Bak, and M. Svenstrup. Survey of wind farm control - power and fatigue optimization. *Wind Energy*, 18(8):1333–1351, August 2015. doi: 10.1002/we.1760. Published online 9 May 2014 in Wiley Online Library (onlinelibrary.wiley.com).