

Wind Energ. Sci. Discuss., referee comment RC3
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Comment on wes-2021-144

Anonymous Referee #3

Referee comment on "Prognostics-based adaptive control strategy for lifetime control of wind turbines" by Edwin Kipchirchir et al., Wind Energ. Sci. Discuss.,
<https://doi.org/10.5194/wes-2021-144-RC3>, 2022

Discussion of:

Prognostics-based adaptive control strategy for lifetime control of wind turbines

10 April 2022

The paper presents a suggested adaptive control strategy that could be applied to limit the fatigue damage accumulation in selected wind turbine components, for the wind speed range where the turbine control is based on pitch regulation. The paper shows how the suggested controller strategy successfully limits the loads in a few scenarios, however it fails to show the overall significance of the new strategy with respect to the entire operating envelope of the wind turbine, and does not show any quantitative assessment of the impacts of applying the suggested strategy. A new version of this paper would need to focus significantly more on the validation and performance evaluation of the suggested strategy. A few clarifying comments are below:

General comments

- I don't think the paper title is correct. There are no prognostics discussed in the paper whatsoever, it is rather load mitigation. Hence I would instead call it "Adaptive control strategy for load-based lifetime consumption control of wind turbines"

- It is hard to judge the practical significance of this method. It works only for wind speeds above 12m/s, which in reality only occurs about 25% of the time on a typical site.
- I suspect that if this approach is also applied at lower wind speeds, the power output may be reduced. These and any other limitations need to be clearly outlined.
- There is no quantitative assessment of the performance of the suggested procedure. How much exactly are the loads reduced, what is the increase in the pitch actuator duty cycles, is the behaviour robust and consistent over different realizations? This needs to be shown both for individual wind speeds, but also the total effect over the turbine lifetime needs to be estimated.
- The English needs some checks - there are some spelling issues to correct like "guaranty" instead of "guarantee" but also others.