The manuscript deals with an important issue with respect to wind farm optimization. The proposed inclusion of fatigue damage will certainly be applied soon in practice.

Major Remarks

- the applied coordinate systems as well as the different wind speeds (undisturbed, wake, instantaneous, averaged over blade, averaged over rotor) should be appropriate introduced, e.g. in an added section 2.0; use can be made of e.g. graph of a wind turbine like fig. 7. Furthermore, all names / symbols should be consistently used. The term "effective" should be avoided since it is unclear. Furthermore a capital letter should be used for an averaged value and a lower case letter for instantaneous values), e.g. mean wind speed in wake averaged over rotor: $U_{wake\text{-}rotor}$; instantaneous wind speed averaged over blade: $u_{blade}(\psi,t)$
- In line with the point above it would be better to indicate the velocities and TI in step 3 and 4 with wake velocities and wake TI. Furthermore, it would be better to move lines 247-252 to step 5 (averaging over a blade) and line 253-254 to step 8 (considering the entire rotor)
- The weakest point of the proposed method is the generation of turbulence samples, section 2.1. It can easily be improved by e.g. using the method of Veers https://prod-ng.sandia.gov/techlib-noauth/access-control.cgi/1988/880152.pdf

  By doing so the turbulence will have the correct spectrum (which is essential for a fatigue analysis). Since in section 2.7 the instantaneous wind speed is needed, varying with azimuth, the so-called rotational sampled wind speed should be used, e.g. at a radius of ¾ R. This can be obtained by first generating a wind field on a rectangular grid (Veers) and next take the wind speed as seen by a blade element (at ¾ R) rotating through this turbulent wind field.

- Line 128 / 129: “The tuning constants … depend on the blade azimuth angle”; it is unclear why that is the case since there is no periodic loading (like yaw, shear, turbulence and tower shadow)
- Line 272: “just considering these two azimuth angles is sufficient”; this implies that each revolution will lead to exactly 1 load cycle. In reality, each revolution will contain plenty of smaller load cycles as well. Since fatigue behaves rather nonlinear one can’t tell in advance that neglecting these smaller load cycles is allowed.
- Comparison with SOWFA/FAST; an appendix can be added in which the steady turbine response is compared (i.e.: C_T, P, Ω, θ, $M_{flatwise}$, $M_{edgewise}$) for just 1 wind speed (say 13 m/s) during say 4 to 5 revolutions. In the model (section 2) the same wind input should be used

Minor Remarks

- Line 27: add “wind shear”
- Line 77: mention one of these “interactions”
- Line 95: change “wind speed” into “undisturbed mean wind speed”; see also 1st bullet point Major Remarks
- Line 99/100: change “effective wind speed across the blade” into “wind speed averaged over blade”; see also 1st bullet point Major Remarks
- Section 2.2: since the Loads Surrogates are derived only once, it is not clear why not the more sophisticated package FAST has been used

- Eq. (2); perhaps it is better to use the symbol q for a force per length instead of F
- Table 1: mention the units of the constants a to g as well as Psi and Theta
- Figure 5: why does the x-axis not continue until the cut out wind speed? Mention if these curves apply for the case Theta is less then OR greater than 0.05 rad. (Table 1)
- Line 141: This is in contradiction to the outcome of a BEM calculation I did (based on the NREL 5 turbine): the effect of a change of 1 degree in pitch correspond to about a variation of rotational speed of 8 %
- Eq. 5: Delta_u and u_infinity: use capital letters instead; change “d” into “D”
- Line 153: also introduce delta and z_h
- Line 168: add: and delta=0
- Eq. (10): add nTurbs (upper bound summation)
- Figure 7: add a figure with the variation of the wind speed as function of azimuth (for an offset of e.g. 1D) and compare with the averaged value (over the azimuth) as well as the average of the 4 sample points
- Figure 8; “offset” has not been properly introduced yet
- Title section 2.4: change “Intensity” into “Intensities” (in line with Fig. 1)
- Line 205: change “mean” into “undisturbed mean”
- Page 13: Also introduce delta (from Eq. (11))
- Eq. (23): add, for clarity: TI(r)=TI_a + Delta_TI, with Delta_TI given by Eq. (11)
- Title 2.5: adopt; see 1st bullet point Major Remarks
- Eq. (24): change U into U(r); + mention the equation for U(r) (is it Eq. (10)?)
- Section 2.6; show in an appendix a few examples of wind speed, rotational speed, pitch angle and bending moments varying over the azimuth angle.
- Eq. (26): adopt; see 1st bullet point Major Remarks; make 2 versions (Eq. 26a and 26b): one with TI averaged over blade (from Eq. (23)) and one with TI averaged over rotor
- Line 282: I guess it should be step 4 (instead of 3)
- Section 2.9 / line 296: refer to Eq. (26a)
- Section 2.7: refer to Eq. (26b)
- Line 361: change step 7 into step 8
- Line 404 (end): typo “us”
- Line 442: add a statement about tower shadow
- Line 495: skip “about 6 times more” (such a comparison doesn’t make sense)
- Caption Figure 17: add for clarity that 0.04 corresponds with 0.07 normalized
- Line 521: skip digit: about 5%
- Section 5: you may add for further research: to performan several SOWFA simulation in order to determine the spread of the SOWFA results (Fig. 6, 9, 10 and 11)
- Line 631: is wind shear included?