

Paper: wes-2020-107

Title: Low-order modelling for transition prediction applicable to wind-turbine Rotors

Authors: Th. Fava et al.

General:

The authors present results from a simplified model for use of transition prediction for wind turbine rotors. This topic is of considerable current interest not only to develop more adapted aerodynamic profiles to increase aerodynamic efficiency but also from a more scientific point of view to detect the main mechanism for transition from the laminar to turbulent state.

However, it is not always easy to follow the text. Authors should consider:

- a) A list/table of abbreviations,
- b) Improving the style of writing by careful discussion with a native speaker,
- c) Being more exact in the wording,
- d) Shortening the text.
- e) Include references from recent experiments:
(10.5194/wes-5-1487-2020, 10.3390/en12112102)

Specific:

Title: what is meant by “Low order”? Order in what?

What about “A simplified ...”

Line 1: “onset ...” Do you mean the “critical” point, where damping becomes negative first? Or do you mean “start of fully turbulent” region by choice of N?

Line 14. “reasonable accuracy” is not a scientific term. Use: accuracy in numbers instead, pp% for example

Line 19 ff (Intro) so e) from above

Line 21: typo

Line 66 to 69: “However, ... is expected to be more accurate ...” Why?

Line 85: Usually, when using body-fitted coordinates, a metric TENSOR appears (g_{ij}). Please show its relation to the metric VECTOR you are using.

Line 96: “costly” Are we talking about € or \$? Please be more accurate in wording and comparing typical amount of CPU hrs.

Line 228: please give of precise definition of intermittency (γ)

Table 2: Geometry 2: “Varying” is not sufficient. Please state at least names.

Line 268/269: “The discrepancies ... non-respect ... these locations.” This sentence is hard to understand. Please improve.

Line 337: $N = 9$. Why did you choose this very specific value more appropriate for WIND TUNNEL experiments? As you may know, wind turbines operate in very different inflow conditions. Please improve.

Line 340: I do not understand why “ $\gamma=0,01$ ” should correspond to $N=9$. Please explain.

Line 355 ff and Fig. 11: I do not understand your explanation why PSEX/PSER group on one side and PSER 2D/RANS group on the other deviate so much. Instead of a description only, give more possible physical reasons.

Line 389 ff and Fig. 15: I’m not sure if I have fully understood your explanation., If you are changing ω (!) only by a factor of 3, tip-speed-ratio and angles of attack may vary as well that strong, so that your blade fully falls out of a meaningful operating range. On the other side transition location “only” varies by a factor less than two. Please explain in more detail.

Line 392: “accelerates transition”. I think “accelerate” is not the right expression. What about “shifts the transition location closer to the nose”?

Line 457: “reliable estimate”. Again, please state accuracy of your model more quantitatively