

Interactive comment on “A Double Multiple Streamtube model for Vertical Axis Wind Turbines of arbitrary rotor loading” by Anis A. Ayati et al.

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Dear Prof Hubert Branger,

Thank you very much for your comments and kind words. Below we answer your points one by one.

Regarding figure 7a, there is indeed a mismatch in its legend: The solid line should correspond to the old model, and the points should correspond to the new model. This will be corrected in the revised version.

Regarding figure 7b, it is true that the two models show identical predictions, but that is actually, as figure 7b concerns the front half of the rotor. In the front half, the two momentum theories are almost identical: their inlet velocity is the free stream, while their

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drag predictions are almost identical, since Glauert's correction is taken into account (for induction factor greater than 0.4 for the conventional model and greater than 0.7 for the new model, see figure 2 in the manuscript). Therefore, only very slight differences are expected on the predicted quantities of the front half of the rotor, which are due to the small differences of the drag predictions of the two models (when Glauert's correction is included). The difference of predicted quantities is significant only in the rear half of the rotor, where the inlet velocity is now severely dependent on the momentum theory choice of the front half of the rotor. This will be elaborated upon in the revised version.

With respect to dynamic stall, it is very likely that some inaccuracies of the model at low tip speed ratios (i.e. around $\lambda=1$, see figure 9) could be a product of dynamic stall behavior, which is not taken into account in our model. Experimental investigations are ongoing, at Princeton University, in order to quantify and parameterize the dynamic stall effects the same airfoil used for the VAWT turbine. In future work, we envision these results to be incorporated for improved DMST modeling, but it is outside of the scope of this manuscript. Comments on possible effects of dynamic stall in VAWT, and strategies to model such effects in DMST algorithms, will be included in the revised version of the manuscript and the suggested literature will be added.

Yours Sincerely, The authors

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