

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 Referee,

We would like to thank you for your suggestions and kind words. Below we answer your points one by one.

1. The method to link the open area ratio, beta, and velocity through the plate is proposed in Taylor 1944 (Aero. Res. Council. R. and M. no. 2237) and expanded in Steiros and Hultmark 2018 (J. Fluid Mech. 853, R3). In summary, the method models the losses of fluid particles that pass through a pore of the plate, by assuming that all kinetic energy which is due to the acceleration of the fluid particle to enter the pore, is lost due to expansion losses. We will elaborate on that on the revised version.

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2. We will correct the corner of theta. Thank you for pointing out this error.

3. 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 something to be expected, 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 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 tiny 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 in the revised version.

4. The syntax error will be corrected.

Yours Sincerely,

The authors

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