Interactive comment on "Qualitative yaw stability analysis of free-yawing downwind turbines" *by* Gesine Wanke et al.

Anonymous Referee #1

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General comments: A good project investigating design parameters for free-yaw behavior of a downwind turbine, with verification of lower-order dynamic models comparing well with high-fidelity modeling tools.

Specific comments: 1. Should state somewhere that the turbine is 3-bladed and describe the regulation type: variable/constant speed below rated then pitch/stall regulation for power/rotor speed. 2. Also state if the rotor shaft intersects (no offset) the yaw axis. 3. Suggest nomenclature list 4. I don't think that Madsen 2018 should be referenced, unless it is accepted for publication prior to this paper. 5. Recommend checking "Wind Turbine Engineering Design" by Eggleston and Stoddard about yaw behavior. 6. Page 21 line 23- not clear on what is the cost-effective solution- going

downwind? I would speculate that the yaw system required for downwind alignment and de-wrapping (and associated bearings, tower material thickness) would have a much lower torque requirement than that required for upwind operation. 7. Note that I did not review the equations in the appendix in detail. Recommend that the author double-check these.

Technical corrections: Page 1 line 15: change to "loaded higher" P(age)1 L(ine)21- define "turbine" tilt- do you mean shaft? P2 L33- Sine to Since P4 L15-18- these two sentences are not clear P4 L21- change "as it will" to "as flexibility will" P4 L25- not clear if this a vector or scalar quantity. For either, explain/show (another figure) what axis it is about. Figure 1 (and others) the vector triangle on the left/right is not clear- do the grey lines mean something? What is the resultant vector? P6 L18- change "smaller" to "less" Figure 4 increase font size P7 L11- explain the "geometrical parameter" - I do not see it in Figure 4 P9 L13- state if tower shadow modeling is included P9 L22- change sentence to "The model does not include structural damping or bearing friction." P11 L10 change "are resulting into an" to "result in the" P11 L11 change "an" to "the" P11 L12 Sentence not clear, perhaps include figure? P11 L14 not clear on upper equation; reference number P11 L18 Bold M P11 L19 reference matrix number P12 L6 remove comma P12 L6 remove comma after "investigate" P12 L6 remove "to be included" and "any" P13 L14 change to "well; the BEM-code is therefore used for the parameter study" P14 L9 change to "...rotor plane, the lower power production, and the higher..." P14 L12 sentence note clear P15 L18 should "expected" be removed? P15 L19 define/show equation for the shaft length factor P15 L33 change "need to be" to "are" P21 L9 "with 0 degrees" not clear P22 L13 spelling "column" P24 L4 spelling "funded" P25 L4 caps for MOD-0