Response to Reviewer 1

Title: *Pressure Based Lift Estimation and its Application to Feedforward Load Control employing Trailing Edge Flaps*

Dear Reviewer,

We thank you for your interest in our work and the helpful suggestions to improve our paper. The summary of your review is:

Summary of the review, uploaded 13.10.2020:

The paper describes the implementation of a trailing edge flap controller for a quasi two-dimensional airfoil interacting with two-dimensional inflow disturbance created by an active grids of airfoil profiles. Significant room is dedicated to validation of lift estimation strategies by using a three-hole probe before the airfoil and by using three pressure ports on the surface of the airfoil. By comparing with a PID controller, it is shown that the proposed lift estimation strategies perform better at lower reduced fre- quencies and are suitable to alleviate damage equivalent loads by active trailing edge flap control.

In general, this is a very well written paper that reports on interesting ideas and a large body of work. There is little to critique.

Furthermore, please see our point by point answer to your comments in the following. Moreover, changes in the manuscript according to your comments are marked in magenta.

1) **Comment**

For wind turbine applications, it would be useful if the authors could elaborate a bit further which regime, i.e., which exact reduced frequencies, etc. would be expected for turbines of typical industrial rotor diameter and also the Berlin research scale turbine (BeRT) that seems to be the primary target for this load controller.

For a comparison the 75% spanwise position of the DTU 10 MW reference turbine at rated conditions was chosen. The reduced frequencies for 1p and 3p disturbances are 0.019 and 0.056, respectively. In comparison to the Berlin research turbine where at the same spanwise position for 1p and 3p disturbances are k=0.09 and 0.25, respectively. This information is added in section 2. Experimental Setup.

DTU 10 MW			**BeRT**		
0.75 Radius	67,98214	m	0.75 Radius	1,125	
Chord at 0.7 radius	2,59	m	Chord at 0.7 radius	0,2	
Rot Freq	0,16	Hz	Rot Freq	3	
Wind	12	m/s	Wind	6,5	
V_inplane	68,34305	m/s	V_inplane	21,20573	
Vrel	69,38856	m/s	Vrel	22,17956	
1p Freq	0,16	Hz	1p Freq	3	Hz
3p Freq	0,48	Hz	3p Freq	9	Hz
Red. Freq 1p	0,018762		Red. Freq 1p	0,084986	
Red. Freq 3p	0,056286		Red. Freq 3p	0,254958	

2) Some minor typos and questions

p.2, 29: . . .arises which sensor input. . . – ‘on’ deleted

p.4, 18: . . .. by a two-dimensional active grid . . . ‘an’ exchanged by ‘a’

p.6, 31: The underlying methodology . . . ‘underlaying’ exchanged by ‘underlying’

p.6, 33: The reference static pressure was obtained from . . . ‘used’ exchanged by ‘obtained’

p.8, 5: . . . Fourier transformed . . ., 7: ...Fourier transform . ’fourier’ exchanged by ‘Fourier’

p.16, 9: ...which is chosen as... ‘as’ added

p.16, 10 ... equation 11... , 13: Eq. 12 . . . Make sure equations are referenced consistently.
’equation’ exchanged by ‘Eq.’

p.17, 9: What exactly are A and b? Not referred to in any given equations.

A and b are constants that account for non-zero thickness of airfoils in the indicial unsteady aerodynamics code of Gaunaa and Bergami. Therefore, the sentence: ‘In order to account for the non-zero thickness of the airfoil, the indicial constants for the model are calculated in reference to Bergami et al. (2013) and slightly adjusted: A = [0.389; 0.264] and b = [0.380; 0.0564].‘ describes in the authors view what the constants mean. The interested reader is referred to the detailed documentation of the ATEFlap Model referenced in the paper.