

exercise session 3

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Wind Energy Systems, Summer-Semester 2018

Albert-Ludwigs-University, Freiburg, Germany



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1 questions from you...

2 concept questions

3 homework

a question from you...



what's a residual, anyways?



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consider:

you have two functions $f(x)$ and $g(x)$ that should be equal...

... and you want a function R that says 'how close to equal'
 $f(x)$ and $g(x)$ actually are

R is the residual



what's a residual, anyways?

consider:

you have two functions $f(x)$ and $g(x)$ that should be equal...

... and you want a function R that says 'how close to equal'
 $f(x)$ and $g(x)$ actually are

R is the residual

what are the options for R ?

$$R = \frac{f(x)}{g(x)} - 1 \quad \text{or} \quad R = f(x) - g(x) \quad \text{or} \quad R = \frac{f(x) - g(x)}{h(x)} \quad \text{or} \quad \dots$$

... then, chose the R that is 'easiest' for your purpose!

a question from you...



that's nice. what do we do with R ?

use rootfinding (or minimization) on $R(x) = 0$ to solve $f(x) = g(x)$.

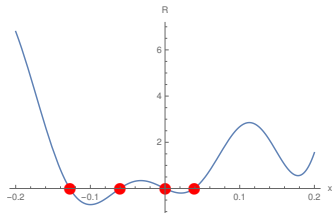
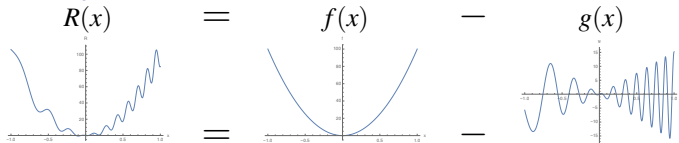
a question from you...



that's nice. what do we do with R ?

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a toy example



$$x \approx -0.13 \text{ or } x \approx -0.06 \text{ or}$$

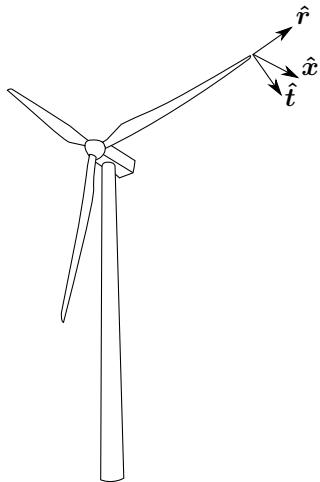
$$x = 0 \text{ or } x \approx 0.04$$

let's play a game...



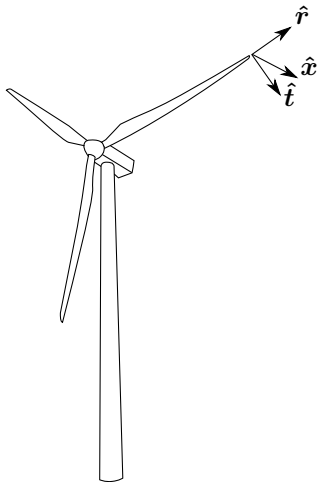
concept questions!

which components of induction actually exist physically?



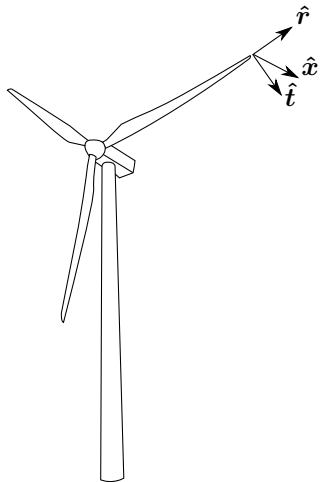
- a) \hat{r} and \hat{t} b) \hat{t} and \hat{x}
- c) \hat{r} and \hat{x} d) \hat{r} , \hat{t} , and \hat{x}

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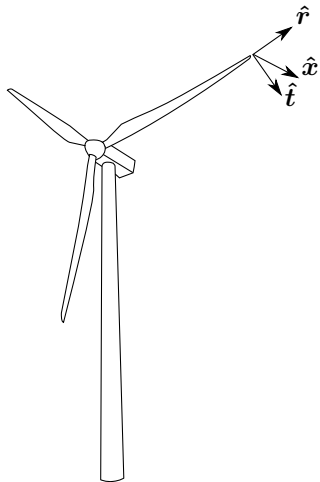
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which components of induction
have we modelled (so far in WES)?



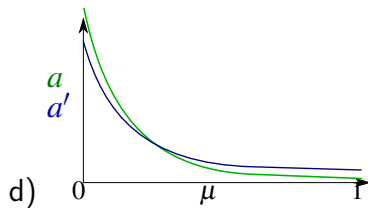
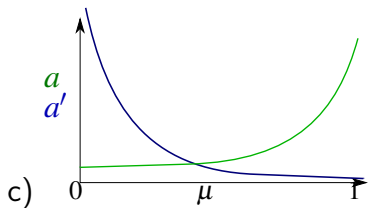
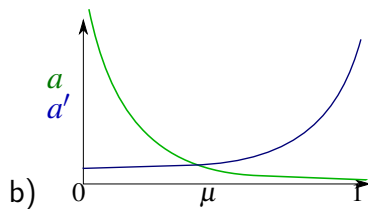
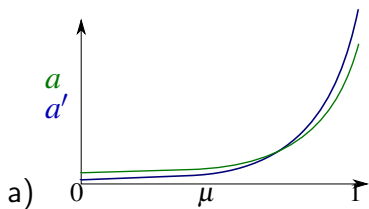
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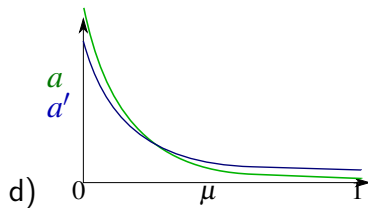
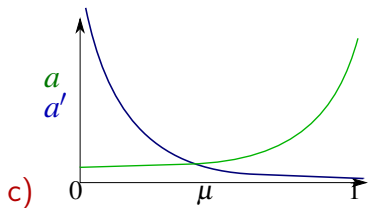
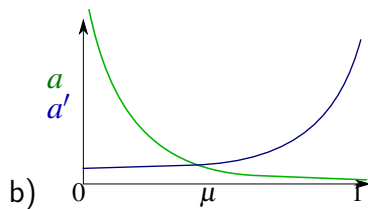
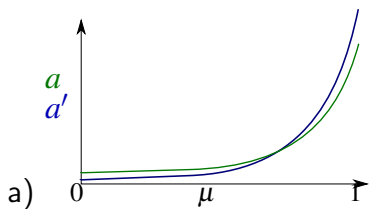
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which is a reasonable distribution?



(... not to scale)

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(... not to scale)

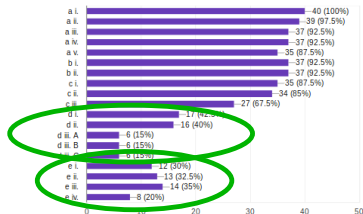
Exercise 1: Classic Momentum Theory

40 responses



Exercise 2: Blade Element Momentum Method

40 responses



1d		2d		2e	
i	Paul Daum	i	Karima Saddedine	i	Cristina R. Alberdi
ii	Irene Franzetti	ii	Sebastian Pascual	ii	Erisa
iii	Aksel Pettersen	iii A	Nick Garder	iii	Simon Gramatte
iv	Di Mu	iii B	Axel Hecht	iv	Valentin Czisch
v	Julian Wilmers	iii C	Naveen Guruprasad		