Assignment 1

BEM Wind Turbine

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Rotor and Wake Aerodynamics

TU Delft

Contents

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Introduction

1.1. Assignment BEM BERNAT

Blabla

1.2. Single polar innacuraciesBERNAT

Chowchow

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Blade Element Momentum theory

2.1. Main assumptions of the BEM theory NIKLAS

Perujo

2.2. Code flow chart CARLOS

CS7. Carlos Simao 7, ô magnifico

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Results

Describe the initial conditions, table, cool

3.1. BEM alligned rotor BERNAT

3.1.1. Main outputs BERNAT

Angle of attack and inflow angle BERNAT
Axial and azimuthal inductions BERNAT
Thrust and azimuthal loading BERNAT
Total thrust and torque BERNAT

3.2. BEM yawed rotor NIKLAS

3.2.1. Main outputs NIKLAS

Angle of attack and inflow angle NIKLAS
Axial and azimuthal inductions NIKLAS
Thrust and azimuthal loading NIKLAS
Total thrust and torque NIKLAS

3.3. Influence of tip correction CARLOS

Plots with explanation of the influence of the tip correction.

3.4. Influence of numerical discretization BERNAT

3.5. Evaluation of stagnation enthalpy CARLOS

Plot the distribution of stagnation enthalpy as a function of radius at four locations: infinity upwind, at the rotor (upwind side), at the rotor (downwind side), infinity downwind.

3.6. System of circulation and vorticity CARLOS

Plot a representation of the system of circulation. Discuss the generation and release of vorticity in relation to the loading and circulation over the blade.

3.7. Operational point NIKLAS

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Optional

4.1. Explanation of the design approach used for maximizing the Cp or efficiency

Blabla

4.2. Plots with explanation of the new designs

Rick Sanchez

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Conclusions NIKLAS

SHORT discussion/conclusion, including the similarities and differences between the two rotor configurations (yaw vs. aligned rotor), flow field and operation

Bibliography