

Assignment 1

BEM Wind Turbine

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Rotor and Wake Aerodynamics



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Introduction

1.1. Assignment BEM **BERNAT**

Blabla

1.2. Single polar innacuracies **BERNAT**

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**

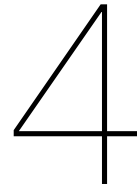
3.5. Evaluation of stagnation enthalpy **CARLOS**

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**



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