Creation of a high-pressure turbine design tool

Defensa de Trabajo Fin de Grado
Grado en Ingeniería Aeroespacial en Vehículos Aeroespaciales

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Part 1: Introduction

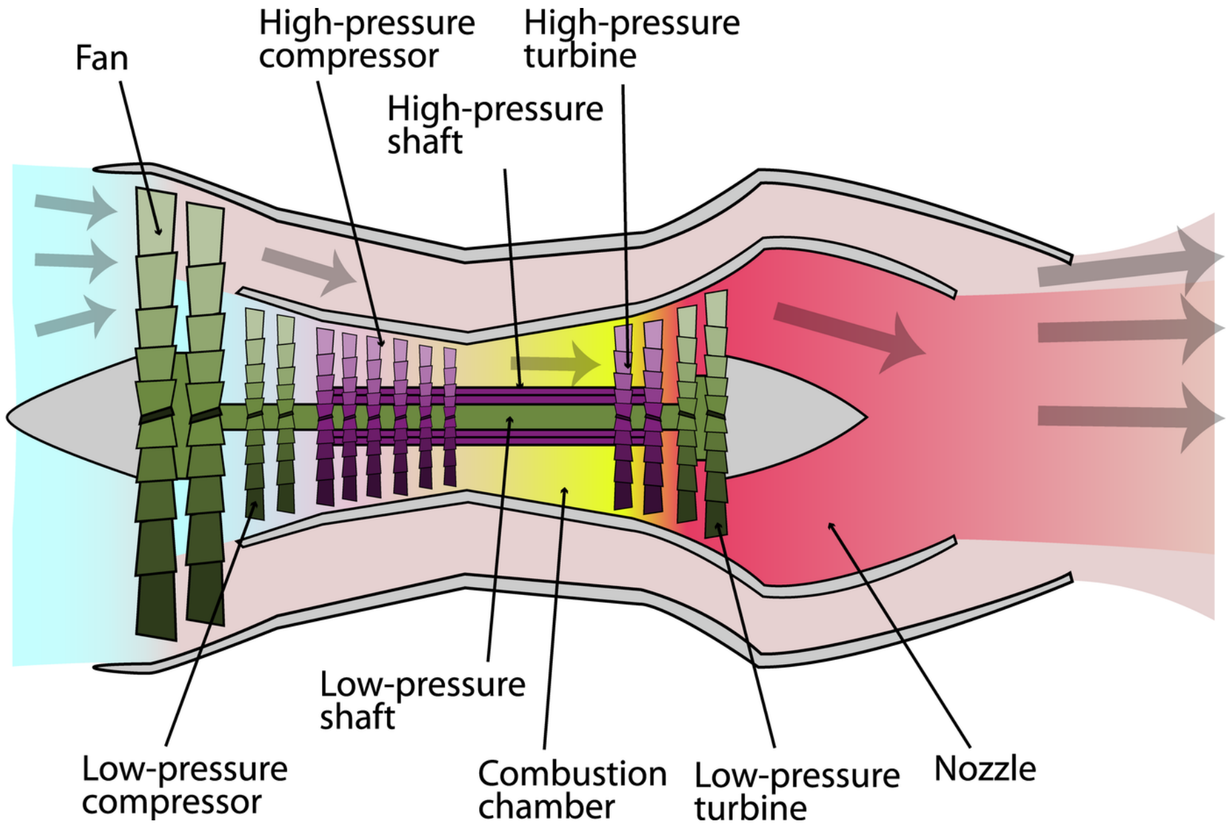
Part 2: 1D model of turbine

Part 3: Loss correlations

Part 4: Test cases and results

Introduction

A **turbine** in a gas turbine engine extracts **energy** from the airflow to move the compressor.



[1]

Introduction

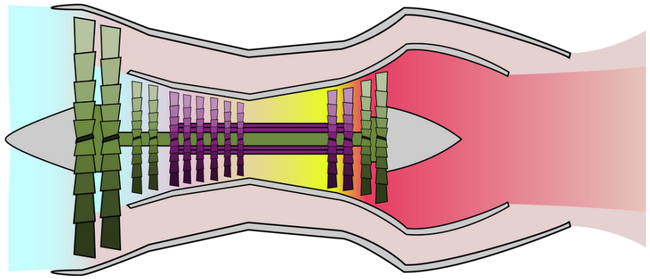
Turbine blade design is done with specialized software which requires **inputs**:

- Chord
- Hub diameter
- Blade height
- Metal angles
- Stagger angles
- Blade spacing
- …

[2]

Introduction

From the **thermodynamics** of the turbine stage, or even the entire engine, determine the geometrical parameters for **blade design**.



DESIGN TOOL

[1] [·]

Introduction

For given **requirements**, find the appropriate geometry.

Centered on **aerodynamic losses**, but taking into account **constraints** from other disciplines.

Empirical loss correlation models bring high predictive power.

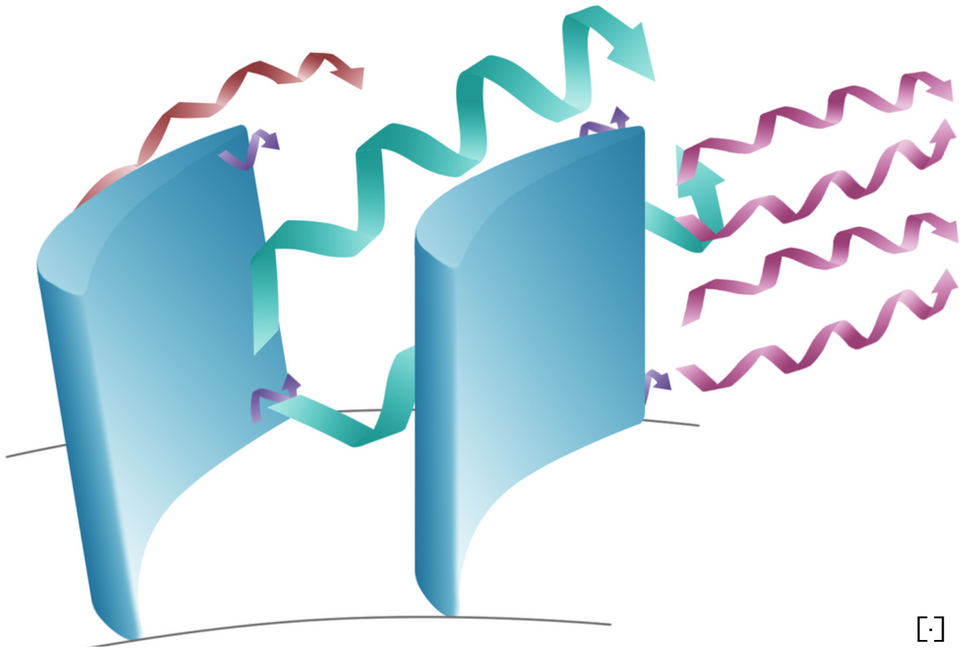


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Image references

The images used in this presentation have been extracted from the following sources

[1] K. Aainsqatsi. Turbofan operation lbp diagram. CC BY-SA 3.0,via WikimediaCommons, 2008

[2] High Pressure Gas Turbine Blade Inspection, *Improving the Quality of Turbine Blade Inspection with NDT-RAM*. The Modal Shop.

[·] Image crated by the author