Lehrstuhl für Turbomaschinen und Flugantriebe
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TUM

Dimensionality reduction for space exploration in a meta-heuristic turbomachinery optimization

Despite the constantly increasing computational capability of modern clusters, the aerodynamic optimization of turbo-machine blade rows still remains a challenge to tackle in terms of optimization-time. Particularly time-demanding in a numerical optimization is the space exploration and exploitation performed by the optimizing tool, which performs the task of finding an optimum geometry through an iterative process of "walking across" the domain of optimization. The scope of this research is to reduce the time requested for such space exploration and exploitation, reducing the explored space dimensions resorting to a peculiar characteristic of the NURBS. Starting from 3D CFD results of axial compressor vanes, it is requested to analyze the data available and find correlations backing the reduced optimization time.
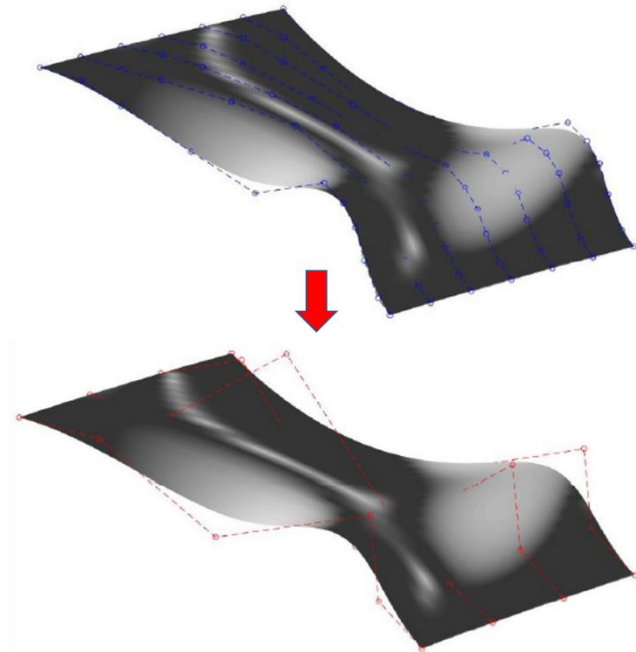
Thesis type: Semester Thesis (Semesterarbeit)

Requirements:
- Studying in mechanical engineering or a comparable course of study
- Basic knowledge of Turbomachinery and CFD
- Basic experience in Python or Matlab
- Autonomous and precise style of work
- Fluent English language knowledge

Tasks:
- Basic literature research
- Getting to know the results data available
- Getting to know the tools used
  o Geometry generator
  o CFD solver
  o Optimizer
- Data Analysis
- Post processing of the results

Start:
- Flexible

Duration:
- 6-7 months