

LIGHTWEIGHT AND ADDITIVE MANUFACTURING FOR OPTIMIZED CYCLOIDAL REDUCERS

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TECHNISCHE
UNIVERSITÄT
DARMSTADT



BACHELOR THESIS



MASTER THESIS



ADP



AERO SPACE ENG.



MECH. ENG.

- Robots
- Light weight design
- Additive Manufacturing



Motivation

The target of this thesis is to develop lightweight solutions considering 3D printing technologies for high performance-to-cost implementations. Detailed parameters, such as clearance, deformation, accuracy, backlash, stiffness, load capacity of cycloid drives will be discussed during material and topology design. Meanwhile, proper 3D printing settings will be investigated to ensure large contact areas for load transfer and low shear stress. Software-based design methods will be applied in the parameter analysis to efficiently guide gearing design. For this, suitable mathematical modelling strategies and parametric uncertainties will be analyzed in detail. Thesis will be performed remotely with UNINA, Naples.

Tasks

- Literature research
- Modelling and parameter design for cycloid drive hardware optimization with multi-criteria

Desirable:

- Experience in structural design
- CAD/FEM basic knowledge

Start

September 2025



UNIVERSITÀ DEGLI STUDI DI NAPOLI
FEDERICO II

