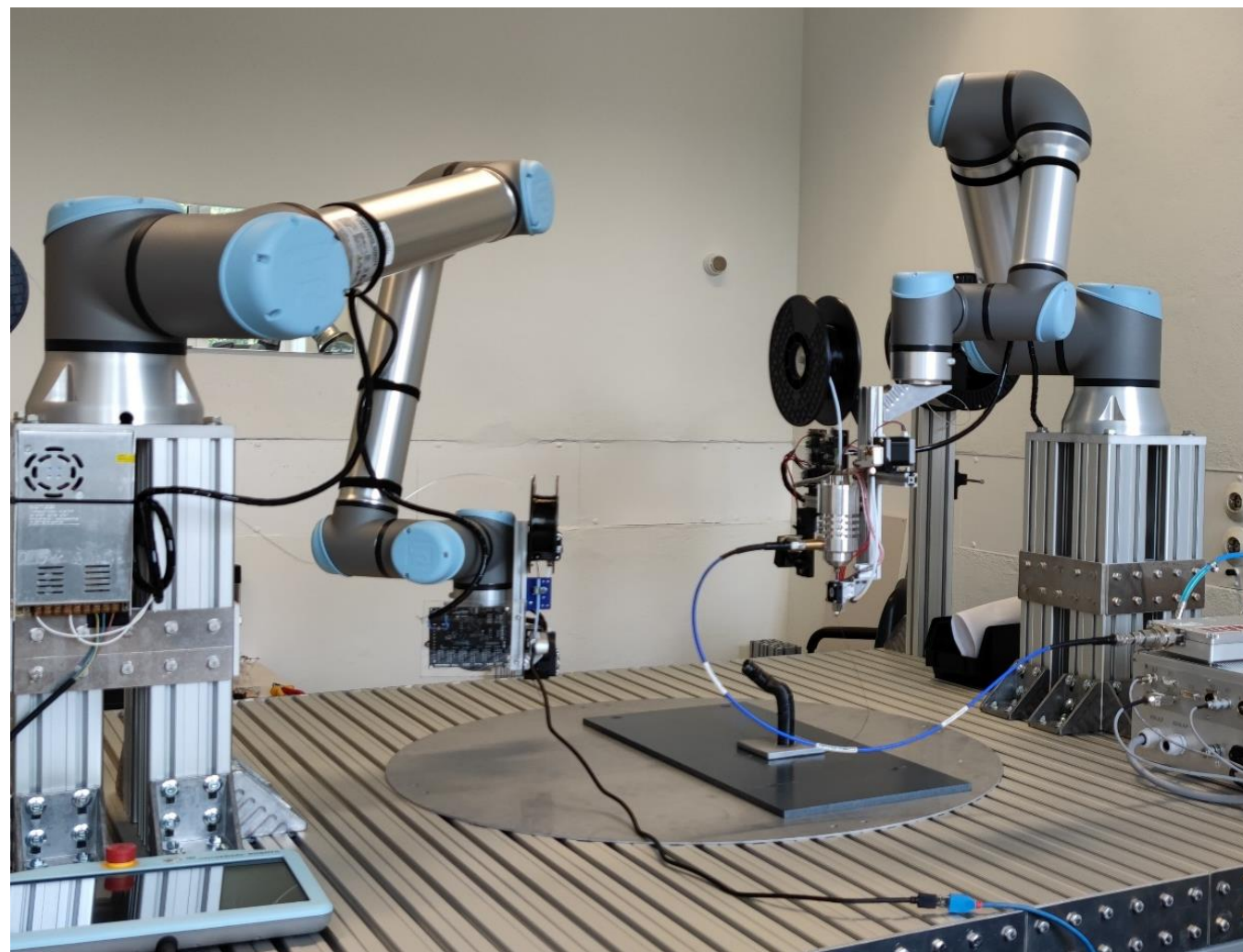
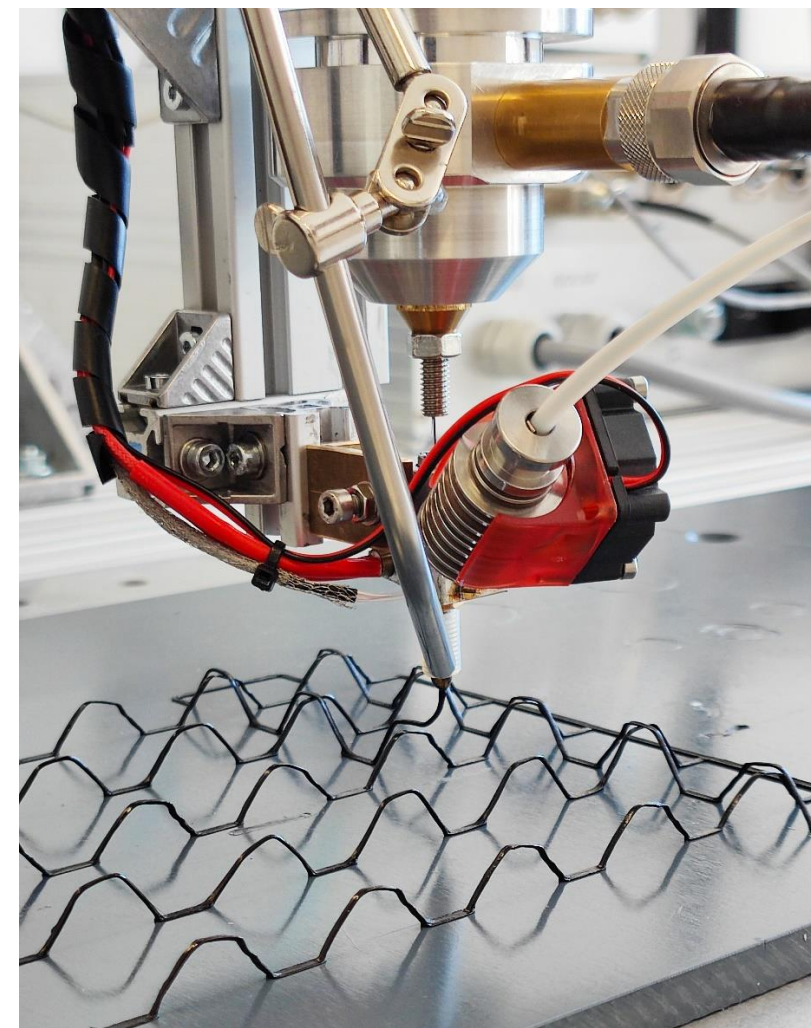


Masterarbeit

UR16e Robot based Additive Manufacturing of Self-supported Sandwich Structures



UR robot printing system



Printed sandwich core

Motivation:

Recently, 3D printing continuous carbon fiber reinforced thermoplastic sandwich draws lots of attention because the density and dimension of sandwich cores can be tailored during the printing process. However, the layer-by-layer printing in a slow speed limited the performance of the sandwich structures. To achieve a non-layer printing of sandwich structures, we have researched a new additive manufacturing technology named "SERPENS" by using microwave heating. By extruding the pre-prepared continuous carbon fiber reinforced composite filament through the printing head, the self-supported sandwich cores are printed in a form of pyramidal lattice trusses. It is expected that a 3D lattice sandwich core will demonstrate a high strength-to-relative-density ratio than a honeycomb that is widely used in lightweight components.

Contents:

- Research on the state-of-the-art robot printing methods for continuous fiber reinforced composites
- Selection and implementation of suitable lattice cells for handling the self-supported structures
- Identification of the load conditions of the sandwich core during printing process
- Printing of designed lattice structures by using the UR robot and microwave printing head

Requirements: Mechanical engineering, electrical engineering, material science or comparable

Type of work: Design, Analytics, Practice

Prerequisites:

- Motivation and interest in the area of 3D printing, or robot control
- Independent and structured way of working
- Previous knowledge and experience on robot operation is an advantage

Start time: now

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