

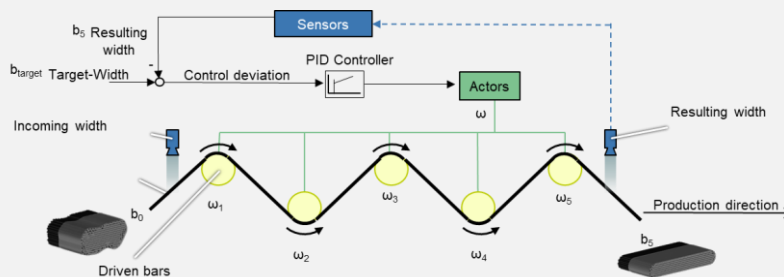
Intelligent control strategies in continuous production processes, using the example of high-modulus fiber tape manufacturing (Koop. ITA)

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Type of Work: Project Work, BA/MA-Thesis or HiWi



Lightweight construction is considered one of the key technologies for reducing CO₂ emissions. In contrast to conventional reinforcement semi-finished products such as fabrics or woven materials, tapes can be further processed in an automated and low-waste manner using Automated Tape Laying (ATL). During the production of tapes, a process called spreading occurs – here, the original roving is pulled over 5 driven bars and spread from a thick, oval cross-section into a flat, wide band (tape). A width tolerance of ± 0.1 to ± 0.5 mm is necessary for use in Automated Tape Laying, but in the current system, the width fluctuation is ± 0.7 mm. Difficulties arise because the tape properties (such as filament interlacing), which lead to different spreading, are not directly measurable and also change continuously. The aim of the research work is an integration of width sensors after each bar and the development of a suitable control algorithm to achieve the desired width tolerance.

Possible research directions:

- Evaluation of measurement data
- Implicit modeling of system behavior based on measurement data
- Development of suitable control strategies
- Development of suitable parameter tuning strategies

Requirements:

- Studies in mechanical engineering, electrical engineering, industrial engineering, CES, or similar disciplines
- High motivation and enthusiasm for topics related to data analysis and control engineering, as well as working with a real process
- Independent, reliable working method

We offer:

- Interesting work in an innovative field
- Participation in shaping the project, work focuses, and contribution of own ideas
- Close, regular supervision in German or English
- Working on a real plant at the ITA (Institute for Textile Technology)
- Excellent working atmosphere in a highly motivated team in an exceptional backyard location with an office dog