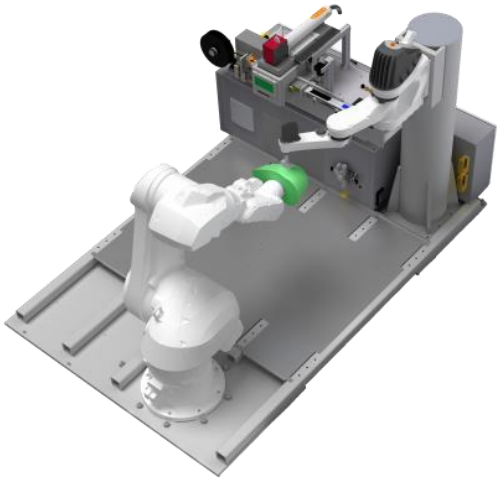
Chair for Computation in Engineering
Chair of Computational Modeling and Simulation

Software Lab:

Modeling: ★★★☆☆
Mathematics: ★★★☆☆
Programming: ★★★☆☆

Develop an application to compute lines of flux from Finite-Element simulation results (Cevotec GmbH)

Setting



Cevotec GmbH is a startup company which automatizes fiber patch placement for automated manufacturing of complex carbon parts. Cevotec was founded in February 2015 and currently offers the hardware product “SAMBA” for manufacturing the parts and the software product “Artist Studio” for modelling and optimizing the patch layup as well as performing the robot simulation including collision detection.

Within the next development cycle the software product will be enhanced to allow an optimization w.r.t. the lines of flux coming from a Finite-Element analysis in order to create parts that are highly optimized w.r.t. the applied loads and forces. As a first step to this approach, the results of a Finite-Element analysis have to be analyzed and the lines of flux have to be computed, discretized and projected onto the original CAD surface. This part will be the task of your software-lab and should become part of our future software product.

Task

Create an application that

- Reads Finite-Element results into a database
- Computes and extracts the lines of flux w.r.t. the Finite-Element analysis result
- Projects the extracted lines onto the CAD surface and creates geometric curves

Supervisors

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References

[1] H. Moldenhauer, Die Visualisierung des Kraftflusses in Stahlbaukonstruktionen. In: Stahlbau 81 (1), S. 32–40. DOI: 10.1002/stab.201201473, 2012

[2] B. Fischer, B. Horn, C. Bartelt, Y. Blößl, Method for an Automated Optimization of Fiber Patch Placement Layup Designs. In: cmaterials 5 (2), S. 37–46. DOI: 10.5923/j.cmaterials.20150502.03, 2015