

Pointing Control for Solar Sails

Ramin Geshnizjani✉

✉ ramin.geshnizjani@tum.de

Published: 12 October 2026 / remains online until filled

Background

Solar sails offer the possibility of fuel-free interplanetary transfers using solar radiation pressure as propulsion. To ensure that a solar sail always accelerates in the desired direction, its attitude must be controlled.

However, precise attitude control is a great challenge for light-weight or low-cost systems without heavy or expensive sensors and actuators.

Previous work at the Chair of Astrodynamics has analyzed the feasibility of attitude control using CoM shifting and provided a proof-of-concept of a stabilizing controller, yet without investigating pointing performance.

Based on that previous work, this thesis shall identify the main drivers of pointing performance for solar sails, develop corresponding performance models, and determine a way forward to improve the pointing performance.

We are looking forward to your application with a short *motivation letter* (max 1 page), a tabular *CV*, a current *transcript of records* and a description/list of all *relevant experience*.

Tasks

1. Literature review to identify the state-of-the-art regarding achievable pointing performance of solar sails
2. Identification of the major drivers that affect pointing performance
3. Implementation of performance models in an existing solar sail dynamics simulator
4. Identification of potential avenues for improving solar sail pointing accuracy
5. Documentation of the work

Prerequisites

- Currently enrolled as a Master's student in Aerospace at TUM
- Good knowledge of spacecraft attitude mechanics and control as well as control engineering
- Programming experience in at least one of the following: Python, Julia, MATLAB
- Ability to work independently