

STSM Scientific Report

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Solar Power Tower (SPT) plant technology is very promising within the field of Renewable Energy. Despite the fact that the research topic is already well established, with publications dating from the 1970s, there are many mathematical challenges which remain unsolved. The research team at the Instituto de Matemáticas de la Universidad de Sevilla (IMUS) works with TSK Flagsol and the University of Aachen in order to further this research, by integrating it into industrial projects and goals. Therefore the purpose of this STSM was to further the integration of our work and to develop new and existing projects, through a combination of information exchange and technical level discussions. Part of this visit was also to present and document past results from IMUS to meet project milestones, whereby a research paper has been submitted for review.

From this visit, we have developed two new ideas for further research and have begun to allocate tasks between IMUS and the University of Aachen. The developed ideas have been tailored to suit the project milestones and also technical details from TSK Flagsol. The first of these ideas considers a more technical aspect of the SPT plant, the thermal transfer of energy through the system components. This topic is important to all three stakeholders, as it is a key component for the efficiency for the plant, as well as being an interesting research topic from a theoretical viewpoint. This is of interest to the IMUS team as it will link back to the recently submitted research paper on aiming strategies for SPT plants. The second topic concerns cleaning strategies for SPT plants, where we will look to bridge the divide between academic research on SPT plant structure and engineering realities from TSK Flagsol. The intention being to generate feasible engineering solutions, which have been optimised by IMUS and the University of Aachen, using the engineering expertise of TSK Flagsol.

Project meetings during this STSM have led to the schedule for the new research topics being established, with project milestones and distribution of work. This will allow us to efficiently work towards our goals and to produce academic papers.

The STSM funding was crucial for the success of this visit, as it allowed free movement between stakeholders locations and the ability to stay for a prolonged period, providing the best chance to develop innovative ideas.