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Characterisation of Primary Optical Mirrors for Fresnel Collectors.

ABSTRACT - Masterthesis

In the course of this work a test setup for the characterization of mirror segments for power plants designed by the Solar PACES guideline "Measurement and Assessment of mirror shape for concentrating solar collectors" was put into practice. The collected primary data were processed and sensitivity analysis was performed to determine the relationship between angle of rotation and a root mean square value of the local slope variations. Measurement accuracy also depends on the camera, where lens possess some distortion like radial distortion and tangential distortion which deviates from the ideal plane. Field of view L parameters which also play an important role helps the fringe processor tool to create a reference plane for the mirror measurement.

One aim of the study was to calibrate a camera to remove distortions in the image, which finds camera parameters: focal length, centre of the image. Second to find the L parameters calculated using the field of view. Finally geometrical arrangement of the components camera, projector and mirror was done for the measurement.

For the field measurement with 10 mirrors, inclination of the mirrors were calculated using different measurement methods such as tachymeter measurement, fringe processor shape values and gradient values obtained by evaluation process. Transformation of measurement position to ideal position for the evaluation and slope deviation root mean square depends on the inclination of mirrors and position.