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Electrical Control and Safety System for Solar Furnace

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The Valparaiso University College of Engineering has recently received a donor gift and a federal earmark to design and manufacture a solar furnace facility. In the solar facility, a heliostat will reflect sunlight straight into the concentrator at every instant. However, due to manufacturing tolerances and inaccuracy in sun's position model a sun sensor is added in the heliostat sun tracking system. The sun sensor fine adjusts the heliostat's position so the reflected sunlight is normal to the concentrator. Our goal is to develop a sun sensor that provides an unbalanced output signal when the sensors receive an unbalanced light source. The plan is to implement the sun sensor on the quarter scale heliostat prototype in conjunction with a step-tracking control strategy programmed using LabVIEW FPGA in Compact RIO National Instrument (NI) hardware.

Information about the Author:

Parisa Nasserifar is a senior electrical engineer with a math minor at Valparaiso University. She is interested in writing programs in the LabVIEW, MATLAB programming languages, control system design, and electrical circuits.

Jason Toberman is from Wisconsin and is entering into his sophomore year as an electrical and mechanical engineering student wishing to pursue a career in renewable energies. He is very interested in the Solar Thermal Electrolysis Process and how the mechanical and electrical components of the system make it possible.

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