DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

NORTH SOUTH UNVERSITY

SENIOR DESIGN PROJECT

FLOATING PHOTOVOLTAIC DUAL AXIS SOLAR TRACKER: Wave model and its effect on the tilt angle

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Spring, 2021

DECLARATION

This is to declare that this is an original report of our senior design project, has been written by us, and has not been submitted for any previous degree or program. The experimental work is entirely our work; the collaborative contributions from any additional materials have been indicated clearly and acknowledged.

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APPROVAL

The senior design project titled **"FLOATING PHOTOVOLTAIC DUAL AXIS SOLAR TRACKER: Wave model and its effect on tilt angle"** by **Shahriar Ahmed Khan Kaif (ID#1721492043)**, **Md. Abdullah Al- Hamim (ID# 1712678643)**, **Nazifa Reza (ID# 1631304043)**, and **Fatin Anwar (ID# 1620901043)** has been accepted as satisfactory and approved in partial fulfillment for the requirement of the Degree of Bachelor of Science in Electrical and Electronics Engineering for the Spring semester of 2021.

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ABSTRACT

This report presents the design and practical implementation of a cost-effective floating active photovoltaic dual-axis solar tracker (PV DAST) that can keep track of the sun's movement every hour from sunset to sunrise. The performance of a solar panel is maximum when the incident solar radiation is normal on the surface of the panel. For obtaining the best results, in terms of collected energy, the PV DAST must first be appropriately aligned towards the sun and tilted at the optimum angle. The optimization of the tilt angle of the solar panels aims to maximize the solar energy collected, thus reducing the active solar-thermal surface with the constant maintenance of thermal energy production, installation, maintenance cost, etc. In our project, we mainly focused on the rotating and floating structures of the plant. This system is mainly based on following a light source by angling the PV panel through two servo motors, ideally in the direction of sunlight rays. For higher efficiency, the solar panel has to track in two axes, the elevation and altitude axis. Hence, dual-axis tracking system. DASTs move along with the two fundamental directions, horizontal and vertical, making them more flexible and adaptable in constantly following the moving sun in any direction, whether from east to west or seasonal, without losing any sunlight. Our main objective was to study the effect of water waves on the tilt angle of the solar PV panel and overall produced energy from the system. This paper discusses the development of a floating dual-axis mechanism that absorbs shock from incoming wind and water waves and, in turn, keeps its initial resting angle constant. The floating PV (FPV) can adjust with the wind and wave partition to find the best tilt angle.