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SHAFTS DESIGN OF A GEAR BASED AZIMUTHAL TRACKED PHOTOVOLTAIC PLATFORM

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Abstract

It is of major importance that the mechanical structures and components of a photovoltaic (PV) system to have the same durability as the PV modules. The embodiment design process of the mechanical structure becomes significant as the results provide an overall view of the PV system durability. The performance of the mechanical system must be attained based on functional and operational requirements of the PV system. Therefore, the modelling and theoretical analysis of the mechanical behaviour of the components is necessary in order to achieve high performance and low cost products. Considering different load cases the shafts of a particularly gear based azimuthal tracked photovoltaic platform are analyzed. The system in analysis represents a simplified constructive solution of the one described in Butuc et al. (2011a) and Moldovean et al., (2010). The wind and weight load induced forces are determined in accordance to each operation mode of the PV system. The mechanical transmission housing of the altitudinal axes was analyzed in Butuc et al. (2010), therefore in this paper is evaluated the mechanical behaviour of the shafts considering the finite element method modelling results.

Key words: FEM analysis, gear based azimuthal tracking system, PV platform, wind load

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