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Parameters Influencing the Output Precision of a Lens-Lens Beam Generator Solar Concentrator

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Abstract : The Lens-Lens Beam Generator (LLBG) is a Fresnel-based optical concentrating technique which provides flexibility in selecting the solar receiver location compared to conventional techniques through generating a powerful concentrated collimated solar beam. In order to achieve that, two successive lenses are used and followed by a flat mirror. Hence the generated beam emerging from the LLBG has a high power flux which impinges on the target receiver, it is important to determine the precision of the system output. In this present work, mathematical investigation of different parameters affecting the precision of the output beam is carried out. These parameters include: Deflection in sun-facing lens and its holding arm, delay in updating the solar tracking system, and the flat mirror surface flatness. Moreover, relationships that describe the power lost due to the effect of each parameter are derived in this study.

Keywords : Fresnel lens, LLBG, solar concentrator, solar tracking
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