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Maximum power point tracking on stand-alone solar power System: Three-point-weighting method incorporating mid-point tracking

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Abstract

This paper proposes a three-point-weighting method that incorporates mid-point tracking to improve the drawback of the perturbation and observation method and to enhance the efficiency of the three-point-weighting method. A design was simulated with PSIM, followed by hardware tests of a stand-alone solar power system using real-time Matlab/Simulink hardware-in-the-loop, for observing the efficiency of the perturbation and observation method, the three-point-weighting method, and the proposed method. It was found that the proposed method tracked better than the three-point-weighting method, and it was capable of improving the deficiency of perturbation and observation method that has difficulty to track from the open-circuit voltage (on the right hand side of the P-V curve) as well as enhancing the precision of the three-point-weighting method in the case of zero-weight.