

Efficient Feasibility Checking Algorithm of Photovoltaic Array Reconfiguration

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Abstract—Power generation efficiency of photovoltaic (PV) systems is significantly affected by partial shading and PV cell damage. Partial shading or PV cell damage induces mismatched power generation among PV panels. Conducted bypass diodes under mismatch conditions result in loss of efficiency in power generation. Mismatched PV array can be recovered by reconfiguring electrical connections among PV panels in it. In this paper, a feasibility check problem of PV panel reconfiguration is introduced. This problem identifies whether a connection among PV panels can be configured from a given PV module level solution. Proposed algorithm evaluated by comparison with the exhaustive search through random shading distributed PV array. The experimental results demonstrate that proposed algorithm can identify feasible configurations more than 49,000 times faster than the exhaustive search with around 0.5% errors.

Index Terms—PV reconfiguration, partial-shading, mismatch, feasibility, heuristic

I. INTRODUCTION

IN recent years, the use of green and renewable energy sources has been increased with the aim to reduce fossil fuel depletion and environment pollution. Photovoltaic (PV) energy is one of the most promising emerging technologies. PV market growth by improvements of converting unlimited solar energy into electrical energy as well as the cost reductions of PV panels.

II. CONCLUSION

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APPENDIX A

PROOF OF THE FIRST ZONKLAR EQUATION

Appendix one text goes here.

APPENDIX B

Appendix two text goes here.

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