

**EXPERIMENTAL STUDY ON PHOTOVOLTAIC-WIND  
TURBINE HYBRID SYSTEM FOR SMALL POWER  
GENERATION 50 WATT**

**THESIS**

**Organized to meet a part of the requirements to achieve the Master degree of  
Mechanical Engineering**



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**POSTGRADUATE PROGRAM  
SEBELAS MARET UNIVERSITY  
SURAKARTA**

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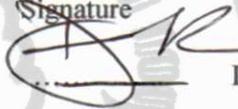
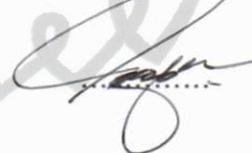
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Nizam, S.T, M.T, Ph.D. Thesis: Mechanical Engineering Department, Graduate  
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**Abstract**

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The PV cell and the wind turbine were played as the main source of energy, whereas the battery was functioned as the secondary energy source. The power flowing to the load was controlled by using DC-DC boost converters with maximum power point tracking (MPPT). The objectives of study are to determine the characteristics of hybrid system for small power generation between PV and wind turbine and to determine the efficiency of hybrid system for small power generation. Matlab software was used to simulate the characteristics of PV-wind turbine hybrid system. The study concluded that, the maximum power generated by hybrid system was 79.3 W at 6 m/s and 1000 W/m<sup>2</sup>. The maximum power produced from PV cell was 24.2 W at 1000 W/m<sup>2</sup> and that from wind turbine was 55.08 W at 6 m/s. In addition, the study indicated that the highest efficiency of hybrid system was 18.8 % at 6 m/s and 400 W/m<sup>2</sup>.

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**Keywords:** Hybrid system, Wind turbine, PV panel, DC-DC Converter, MPPT Control, Battery

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## PREFACE

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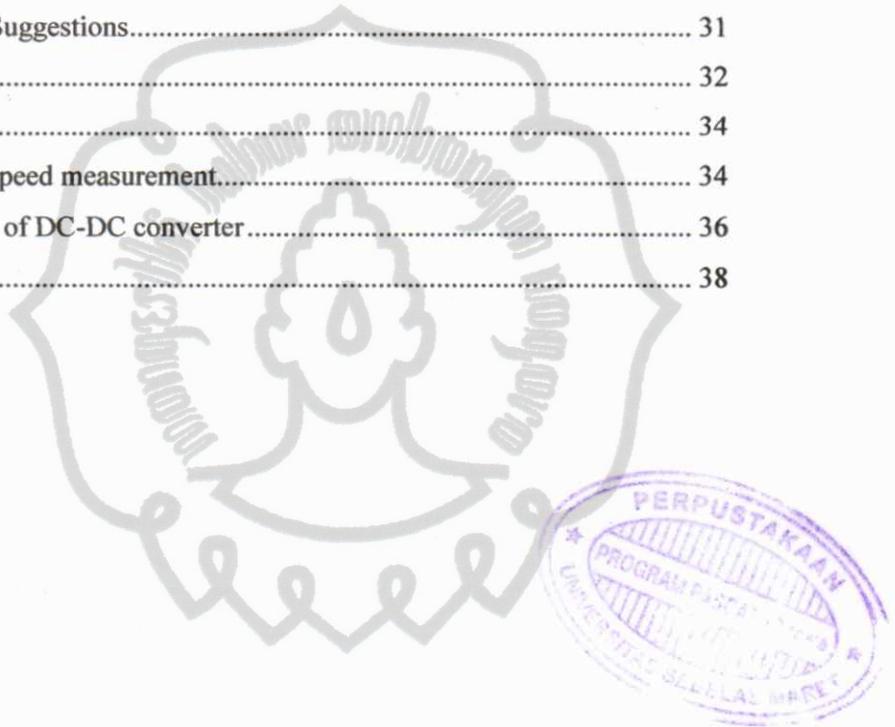
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