

## Real time photovoltaic simulator berbasis personal computer = Real time photovoltaic simulator based on personal computer

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### Abstrak

Laporan skripsi ini membahas tentang Photovoltaic Simulator yang dijalankan secara real time. Penelitian ini terbagi atas komponen software dan hardware. Komponen software meliputi Model Sel Surya yang dijalankan dengan MATLAB Simulink<sup>TM</sup> menggunakan CMEX, sementara komponen hardware meliputi DC-DC converter, yaitu buck converter. Pertama-tama, model matematis dari photovoltaic atau sel surya akan dijelaskan terlebih dahulu. Kemudian, setelah didapat model matematis dari sel surya, Photovoltaic Simulator akan direalisasikan ke dalam MATLAB. Photovoltaic Simulator akan mengendalikan arus buck converter menggunakan pengendali IP dengan referensi terhadap model photovoltaic. Sinyal kendali dari pengendali IP akan dipakai untuk menghasilkan sinyal PWM, yang kemudian dikirimkan ke buck converter. Masukan berupa iradiansi dan suhu diberikan ke Photovoltaic Simulator, kemudian arus dan tegangan dari buck converter akan di-feedback-kan ke Photovoltaic Simulator.

.....This report will explain about Photovoltaic Simulator that is run in real time. This study consists of software and hardware components. Software components are Solar Cell Model that is run in MATLAB Simulink<sup>TM</sup> using CMEX, while the hardware component is a DC-DC converter, which is a buck converter. First, the mathematical model of the solar cell will be explained. Then, the mathematical model of the solar cell is realized into MATLAB. The Photovoltaic Simulator will control the current of the buck converter using IP controller in the reference of the photovoltaic model. Control signals from IP controller are used to generate PWM signal, which then are sent to the buck converter. Irradiance and temperature inputs are given to the Photovoltaic Simulator, then the current and voltage outputs from buck converter will be used as feedbacks to the Photovoltaic Simulator.