Thesis Title	Control of Power Generation with Time-varying Load Demand in Automotive Charging System
Author	Mr. Werachai Pattanapiboon
Degree	Master of Engineering
Faculty	Faculty of Engineering
Thesis Advisor	Asst. Prof. Dr. Paiboon Nakmahachalasint
Year Submitted	2006

ABSTRACT

The automotive charging system is necessary for controlling power output generation of an alternator for a vehicle. The generation of output power in each speed of the alternator is dependent upon the bus voltage, controlled by a voltage regulator. In general, the automotive charging system emphasizes on the alternator's generated power. However, the main duty of voltage regulator is to limit upper voltage limiter in order to prevent an overcharge. If considering in voltage control as needed by load, the automotive charging system still has a limited potential even that a battery connected to the alternator allows the alternator to generate a voltage freely. This freedom is from the difference between terminal voltage of battery and the bus voltage. Even that, the freedom can't be used clearly for controlling voltage in order to increase its ability to control a alternator power. The research presents the way to develop the automotive charging system by bringing voltage and current controller: VCC, instead of voltage regulator, to use to control the power generation of alternator as needed by load. The research methodology can be divided into 2 parts: First, to build an alternator system modeling, and to apply any techniques or electronic theories to the model in order to make use of controlling the alternator's generation, Second to produce a prototype of VCC to audit the idea of voltage control as needed by load. The result of the alternator modeling shows that using an averaged armature synchronous inductance varying with field current can predict power alternator more precisely and cover its operation. In the case of VCC prototype, it shows the potential in controlling power generation with time-varying load demand, and the difference of power when compared with the voltage

regulator (when the alternator currents flowing to the battery are 0 and 5 A). Moreover, it shows the relationships between the fields current versus the alternator current, the field current versus a speed of the alternator. These results ensure that VCC works properly.