

一种电磁探测发射机的 DC-DC 变换器研究与设计

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摘 要: 针对大功率电磁发射机电源系统不理想, 输出电压不稳定性、不可调, 输出电能质量差等不足, 研究了一种 DC-DC 全桥桥式变换电路, 该电路由逆变电路、高频变压器和高频不可控整流桥组成. 分析了该电路运行模式及工作原理, 采用 PID 补偿方式设计了移相控制器. 仿真结果表明, 该变换电路稳态性好、动态性能好, 关断电流快, 电压 0~1 000 V 大范围可调, 适用于高压、大功率场合.

关键词: 变换器; PID 补偿; 模型设计; 动态性能

An Electromagnetic Transmitter to Detect the DC - DC

Converter Research and Design

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Abstract: Power systems of existing high-power high-performance electromagnetic detection equipments are unsatisfactory: the output voltage is instable and non-adjustable and the output electric energy is of poor quality. Aiming at this problem, the authors propose a full-bridge DC-DC converter of bridge mode. The circuit is composed of an inverter circuit, a high-frequency transformer, and a high-frequency uncontrolled rectifier. By studying the operation modes and working principles of the circuit, the research proposes to use the proportion-integration-differentiation (PID) method for compensation, and designs the model for the converter. A comparative analysis shows that the converter has favorable stability, good dynamic performance, little phase margins, and small errors. In addition, the output voltage is adjustable in a large range of 0~1, 000 V. Therefore, it can be used in high-power and high-voltage applications.

Key words: converter circuits; PID compensation; model design; dynamic property

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