



## 能量回收系统双向变换器控制建模及快速实现

### Control Modeling of the Bi-Directional DC/DC Converter and Its Rapid Implementation

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#### 中文摘要

城轨节能和稳定网压对能量回收系统控制提出较高要求。为快速设计其控制,提高开发效率,通过Simulink/Stateflow建立了基于超级电容的城轨能量回收系统模型来快速开发其控制算法,给出了Stateflow特点分析和优化建议。在简要描述算法模型功能和通过仿真验证算法后,自动生成了适合DSP的嵌入式代码。随后总结了基于DSP的快速开发流程,给出了加快控制开发迭代措施,对加快双向直流变换器过渡过程也做了简述。最后,试验验证了生成代码的有效性。这里的控制快速开发方法同样适用于城轨其它电力电子控制系统,对降低开发难度,加快进度有较好参考价值。

#### 英文摘要

The control of energy recovery system is increasingly rigid for urban mass transit to save energy and stabilize voltage. To design a reliable control algorithm rapidly and efficiently, a model of supercapacitor based energy recovery system has been presented via Simulink/Stateflow. Furthermore, the features and optimization suggestions of Stateflow are provided. The function of the algorithm model is described briefly and verified via simulation, then the embedded C code suitable for the LF2407A DSP platform is automatically generated. It also generalizes the rapid implementation flow based on DSP and provides suggestions to the rapid implementation iteration process by researching the generated C code, and the rapid transition of bi-directional DC/DC converter is also discussed. Finally an experiment is built to show the validity of this approach. This methodology is suitable for other power electronics control system for the urban mass transit, and it can facilitate the project development and shorten the development cycle.

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