Modular Railway Function Applying in Automnatic Railway Control

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ABSTRACT

As the needs of high-speed transportation, automatic railway control plays an important roles in mordern transportation system. The automatic railway control conbines the computer engineering with electronic techniques the speed and signalling of the railway such that the railway transportation can be more safe, rapid, and expeditive. In this thesis, we apply boolean algebra to conduct a mathematical model which converts the function of railway networkby combinational logic functions. We named it as Railway Function. The Railway Function is easily for system designer to control and monitor the railway control systems including Centralized Trafffic Control (CTC) and Automatic Train Control (ATC). The Railway Function can be categorized into two parts. One is Railway Turnout Function (RTF) and the other is The Railway Block Function (RBF). The results of RBF can be extended to modular circuits such that the interlocking relationship between railway and turnout can be resolved by the Assembly Theorem and its extension. The minimization algorithm has been proposed to reduce the control Variables of RTF and thus lessen the complexity of the railway network. The RBF control the blocks and inter-blocks of the railway network. THe complex railway network is devided into modular blocks and each block is related by RBF. Finally, the RTF and RBF are combined together to control the whole railway network.

Keywords : Boolean Algebra ; Railway Function ; ＣＴＣ ; ＡＴＣ ; Turnout ; Block

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