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论文

基于电路三要素理论的2-5混值/十值计数器研究

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摘要
通过对2-5混值编码原理、电路三要素理论和N+1值代数理论的分析，定量研究了2-5混值门电路、触发器和带进位/借位的加减法计数器，最后设计了2-5混值/十值译码电路，使计数器输出为十值信号。与以往十值电路的设计方法相比较，此设计方案具有编码效率高、供电电压低等特点。计算机模拟验证了上述理论和依此理论设计的电路的正确性。

关键词 电路设计 2-5混值编码 三要素理论 2-5混值计数器

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Research of 2-5 Mixed-Valued/Ten-Valued Counter Based on Three Essential Circuit Elements

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Abstract
By analyzing the principle of 2-5 mixed-valued coding, the theory of three essential circuit elements and the theory of N+1-valued algebra, the 2-5 mixed-valued gate circuits, flip-flops and up-down counters with carry/borrow bit are investigated quantitatively, the 2-5 mixed-valued/ten-valued encoder is designed in order to make the output of counter become ten-valued signal. Compared with the conventional design of ten-valued circuits, the design has the characteristics of high coding efficiency, low voltage supply, etc. Above theory and circuits based on this theory are verified by computer simulations.

Key words Circuit design 2-5 mixed-valued coding Theory of three essential elements 2-5 mixed-valued counter

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