

基于阈值逻辑的逻辑函数综合算法研究

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Research of Logic Function Synthesis Algorithm Based on Threshold Logic

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摘要

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摘要 阈值逻辑门由于具有强大的逻辑功能且独自构成完备集而备受关注。为了设计以阈值逻辑门为单元结构的电路,该文首先分析了谱技术与阈值函数的关系,并通过零次、一次谱系数计算阈值函数的权值和阈值。对于非阈值函数,该文提出了新的逻辑函数综合算法,可以将任意非阈值函数转化为几个阈值函数和的形式。因此,使用一个或多个阈值逻辑门组成的网络可以实现任意布尔逻辑函数。该算法为共振隧穿二极管的电路设计提供一种新方法。

关键词: 电路设计 阈值逻辑 谱技术 逻辑综合

Abstract: Threshold Logic Gate (TLG) is receiving much attention because of its logic versatility and functionally complete. For the circuit design based on TLG, a method is described to determine whether a function is threshold or not with the spectral technology. The weights and threshold can be calculated by spectral coefficients. As for non-threshold function, a novel logic synthesis algorithm is proposed, which can transform non-threshold function to the sum of some threshold functions. Furthermore, any Boolean logic function can be realized by a collection of TLG using the method in this paper. Proposed algorithm provides a method for circuit design of resonant tunneling diode.

Keywords: Circuit design Threshold logic Spectral technology Logic synthesis

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