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APPLICATION OF F AND F_0 IN THE ELECTROWEAK THEORY

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In the previous work, the traditional flavor-related additive quantum numbers were substituted by the fermion quantum number and the unit electroweak charge, which are, same as the electric charge, conserved in electromagnetic interaction, weak interaction and strong interaction. The empirical selection rules in electroweak interaction were found that they can be interpreted by conservation of the fermion quantum number. In this paper, the weak isospin and the weak hypercharge in the electroweak theory are demonstrated to be equivalent to half of the fermion quantum number and the unit electroweak charge respectively. Therefore, we can unify the traditional flavor-related additive quantum numbers and the additive quantum numbers in the electroweak theory by using only two numbers. Furthermore, we can take a new point of view on the electroweak theory by using these two numbers.

MSC: 70H03, 70H33, 70H30, 81R05, 81V22
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1. Introduction

At the most elementary particle level, the fermions include the quarks and the leptons. During development of elementary particle physics, it was found that the fermions have several additive quantum numbers defined as the electric charge Q (with unit of the electron charge e), the baryon quantum number B, the lepton quantum number L, the hypercharge Y, the isospin I with the isospin projection I_3 and four flavor quantum numbers including S, C, B^* and T. Only Q, B and L are conserved in electromagnetic interaction, strong interaction and weak interaction. Especially, weak interaction changes the lepton only into itself or into the other member of the same generation in the lepton family, so the leptons have three individually conserved lepton quantum numbers L_e, L_μ and L_τ. I is conserved in strong interaction, but not conserved in either electromagnetic interaction or weak interaction. Y, I_3, S, C, B^* and T are conserved in electromagnetic interaction and strong interaction, but not conserved in weak interaction. In weak interaction, the