

# Local Gauge Anomalies and The Standard Model

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## I. INTRODUCTION

## II. CLASSICAL FIELD THEORY & NOETHER'S THEOREM

## III. PATH INTEGRAL & GENERATING FUNCTIONAL

Given a particle position  $x$  at time  $t$  the probability amplitude of a measurement at time  $t'$  observing a position  $x'$  is

$$\begin{aligned} M(x', t'; x, t) &= {}_H \langle x', t' | x, t \rangle_H \\ &= \langle x' | \exp \left[ \frac{-i}{\hbar} \hat{H}(t - t') \right] | x \rangle \end{aligned}$$

now we note that if the states are normalised

$$\int dy |y, t\rangle \langle y, t| = \mathbb{I} \quad (1)$$

we can write

$$M(x', t'; x, t) = \sum_n \psi_n(x') \psi_n^*(x) \exp \left[ \frac{-i}{\hbar} \hat{H}(t - t') \right] \quad (2)$$

which acts as our propagator

$$\psi(x', t') = \int dx M(x', t'; x, t) \psi(x, t) \quad (3)$$

## IV. SCALAR FIELDS & GREEN'S FUNCTIONS

## V. WESS-ZUMINO CONSISTENCY & WARD IDENTITY

## VI. STORA-ZUMINO DESCENT

## VII. DAI-FREED & INDEX THEOREMS