

Introduction to QFT

Assignment 7

Due on 16.12.16

1. (30%) Show explicitly that for a quantum field $f(x, t)$

$$\int_{-\infty}^{\infty} dt_1 \int_{-\infty}^{t_1} dt_2 f(x_1, t_1) f(x_2, t_2) = \frac{1}{2} \int_{-\infty}^{\infty} dt_1 \int_{-\infty}^{\infty} T f(x_1, t_1) f(x_2, t_2) , \quad (1)$$

where T is the time-ordering operator.

2. (70 %) Quantize the real scalar field according to Fermi statistics (that means replacing the commutators of fields and conjugate momenta by anti-commutators). Show that this procedure gives rise to a theory that violates causality.