

## Homework 4, QFT, 276, Fall 2007

1. Find the left and the right invariant vectorfields on the super Lie group  $\mathbb{R}^{1|1}$  with multiplication

$$(t_1, \theta_1) \cdot (t_2, \theta_2) = (t_1 + t_2 + \theta_1 \theta_2, \theta_1 + \theta_2)$$

and show that the right- and left-invariant vector fields commute with each other. Generalize this calculation to any super Heisenberg group.

2. Given a classical field theory, show that the (quotation marked) path integral would lead to a symmetric monoidal functor from the  $d$ -dimensional bordism category of Riemannian manifolds to the category of Hilbert spaces. You can use that the fields  $\Phi(\Sigma)$  are given by sections of some bundle over space-time  $\Sigma$ .

PLEASE RETURN IN CLASS ON TUESDAY, OCT.23.