

FYS 610 Many-particle quantum mechanics

Exercises for 7 April 2017

PROBLEM 22: *Schwartz*, problem 11.1

PROBLEM 23: Show that the trace of the product of an odd number of γ^μ 's vanishes. [Hint: Use $\{\gamma^5, \gamma^\mu\} = 0$].

PROBLEM 24: Show that $(\sigma^{\mu\nu} = \frac{i}{2}[\gamma^\mu, \gamma^\nu])$:

$$AB = A^\mu B_\mu \mathbb{1}_4 - iA_\mu B_\nu \sigma^{\mu\nu}.$$

and hence $\text{Tr}[AB] = 4A \cdot B$, provided $[B^\mu, \gamma^\nu] = 0$.

PROBLEM 25: *Schwartz*, problem 11.4. [Tricky. Problem 23 may be of use.]

PROBLEM 26: Prove eq. (17.9) in Lecture Notes 17.

PROBLEM 27: Prove eq. (17.12) in Lecture Notes 17.