

Quantum Field Theory I

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Problem Set 3

Please answer the following questions and provide us by the end of the TA class on Ordibehesht 4.

1. Please answer to problem 7.1 of [Sch14]
2. Please answer to problem 7.3 of [Sch14]
3. Lagrangian of two particle given by

$$\mathcal{L} = -\frac{1}{2}\phi_1\Box\phi_1 - \frac{1}{2}\phi_2\Box\phi_2 + \frac{\lambda}{2}\phi_1(\partial_\mu\phi_2)(\partial_\mu\phi_2) - \frac{g}{2}\phi_1^2\phi_2, \quad (1)$$

where λ and g are coupling constant. For two body scattering $\phi_1\phi_2 \rightarrow \phi_1\phi_2$ calculate tree-level matrix element.

References

- [Sch14] Matthew Dean Schwartz. *Quantum field theory and the standard model*. Cambridge University Press, New York, 2014.