1 The free scalar field

Lecture 01 – 19.10.2022

1.1 Why Quantum Field Theory?

1.2 Classical scalar field: Lagrangian formalism

Formalize the transition from a classical system with a finite number of degrees of freedom $q_i(t)$ to a system with infinitely many degrees of freedom, i.e. a classical field $\varphi(t, \mathbf{x}) = \varphi(x^\mu)$. We are starting from classical mechanics. The classical action is

$$S = \int_{t_1}^{t_2} \mathrm{d}t L \tag{1.1}$$