

$$\tilde{\delta}\phi_r(x) = \phi'_r(x) - \phi_r(x) , \quad (2.41)$$

which keeps the value of the coordinate x fixed and only takes into account the change of shape of the field.³ The two types of variations are related through

$$\begin{aligned} \tilde{\delta}\phi_r(x) &= \phi'_r(x) - \phi'_r(x') + \phi'_r(x') - \phi_r(x) \\ &= \delta\phi_r(x) - (\phi'_r(x') - \phi'_r(x)) = \delta\phi_r(x) - \frac{\partial\phi'_r(x)}{\partial x_\mu} \delta x_\mu \\ &= \delta\phi_r(x) - \frac{\partial\phi_r}{\partial x_\mu} \delta x_\mu . \end{aligned} \quad (2.42)$$

In the second but last step the first term of the Taylor expansion was inserted and finally, in lowest order, $\phi'_r(x)$, was replaced by $\phi_r(x)$.