

場の量子論 p241check9.2

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$$\mathcal{L}' = \mathcal{L} + \partial_\mu K^\mu(\phi) \quad (1)$$

$$\partial_\mu \left\{ \frac{\partial \mathcal{L}'}{\partial \partial_\mu \phi} \right\} - \frac{\partial \mathcal{L}'}{\partial \phi} \quad (2)$$

$$= \partial_\mu \left\{ \frac{\partial \mathcal{L}}{\partial \partial_\mu \phi} \right\} + \partial_\mu \left\{ \frac{\partial}{\partial \partial_\mu \phi} \partial_\mu K^\mu(\phi) \right\} - \frac{\partial \mathcal{L}}{\partial \phi} - \frac{\partial}{\partial \phi} \partial_\mu K^\mu(\phi) \quad (3)$$

$$= \partial_\mu \left\{ \frac{\partial \mathcal{L}}{\partial \partial_\mu \phi} \right\} + \partial_\mu \left\{ \frac{\partial}{\partial \partial_\mu \phi} \left[\frac{\partial K^\mu(\phi)}{\partial \phi} \partial_\mu \phi \right] \right\} - \frac{\partial \mathcal{L}}{\partial \phi} - \partial_\mu \frac{\partial}{\partial \phi} K^\mu(\phi) \quad (4)$$

$$= \partial_\mu \left\{ \frac{\partial \mathcal{L}}{\partial \partial_\mu \phi} \right\} + \partial_\mu \left\{ \frac{\partial K^\mu(\phi)}{\partial \phi} \right\} - \frac{\partial \mathcal{L}}{\partial \phi} - \partial_\mu \frac{\partial K^\mu(\phi)}{\partial \phi} \quad (5)$$

$$= \partial_\mu \left\{ \frac{\partial \mathcal{L}}{\partial \partial_\mu \phi} \right\} - \frac{\partial \mathcal{L}}{\partial \phi} \quad (6)$$

参考文献

- [1] 坂本眞人著「場の量子論-不変性と自由場を中心にして」(裳華房,2014,ISBN9784785325114)