Action principle and modification of the Faddeev-Popov factor in gauge theories.

Summary: The quantum action (dynamical) principle is exploited to investigate the nature and origin of the Faddeev-Popov (FP) factor in gauge theories without recourse to path integrals. Gauge invariant as well as gauge non-invariant interactions are considered to show that the FP factor needs to be modified in more general cases and expressions for these modifications are derived. In particular we show that a gauge invariant theory does not necessarily imply the familiar FP factor for proper quantization.

MSC:

83A05 Special relativity
81S40 Path integrals in quantum mechanics

Keywords:

action principle; gauge theories; Faddeev-Popov factor; quantization rules

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