The $\mathcal{N} = 4$ SYM

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Abstract

In the present work we study the anomalous dimensions of N ($N=4$ SYM) in the presence of a scalar field and investigate the effects of a scalar field in the $\mathcal{N}$-dimensional limit. We find that in the presence of a scalar field all the anomalous dimensions of the $\mathcal{N}$-dimensional $\mathcal{N}=4$ SYM are singular, i.e., the singularity is not found when the scalar is present. In the presence of an $\mathcal{N}=4$ SYM field, we also prove that the $\mathcal{N}$-dimensional $\mathcal{N}=4$ SYM is a common field theory: the $\mathcal{N}=4$ SYM is a common field theory.