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The Cardy-like limit of the $N=4$ super-Yang-Mills index revisited

Abstract:

We investigate the subleading contributions to the four-dimensional

$N=4$ super-Yang-Mills index in the Cardy-like limit and demonstrate

that the dominant saddle point expansion, with the inclusion of a

$\log(N)$ term, is exact up to exponentially suppressed corrections.

This result is valid even at finite N , as we show numerically for the

$SU(2)$ super-Yang-Mills index. As part of this exploration, we also

point out the role of subdominant saddles on the phase structure of

$N=4$ super-Yang-Mills in the Cardy-like limit.