Localization of Vortex Partition Functions in Super Yang-Mills Theory

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The vortex moduli space with k-vortex number in two-dimesional theories with eight super-charges are constructed in NS5-D0-D2-brane system in [1], [2] as the Kähler quotient spaces. Especially, the vortex partition functions for $\mathcal{N} = (4,4)$ super Yang-Mills theories with vortex number k are $U(k)$ gauged matrix model with four supercharges. But, it is difficult to perform multi-variable integrations directly in vortex partition functions.

We study the localizaiton of the partition function of BPS vortices in $\mathcal{N} = (2,2)$ $U(N)$ super Yang-Mills theory with N-flavor on $\mathbb{R}^2$ in [3]. The vortex partition function for $\mathcal{N} = (2,2)$ super Yang-Mills theory is obtained from the one in $\mathcal{N} = (4,4)$ super Yang-Mills theory by mass deformation. We show that the partition function can be written as Q-exact form and integration in the partition functions is localized to the fixed points which are related to N-tuple one dimensional partitions of positive integers.

References

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[3] Y. Yoshida, "Localization of Vortex Partition Functions in $\mathcal{N} = (2,2)$ Super Yang-Mills theory", arXiv:1101.0872[hep-th].