Item: Nekrasov Partition Function

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There are now literally hundreds of Neraksov Partition functions, all with more or less the same structure:

- lengthy discussions of supersymmetry and/or D-branes
- hand-way justification of reduction to finite dimensional integral
- evaluation of the very easiest cases

It's very hard to say how I can contribute. I still haven't done the superhomework™ so I can't do item one. Item 2 is impossible. Item 3, as soon as soon as I solve the easy case, there are many other solved cases on the math side, with no physical counterpart.

These people communicate well with each other, but maybe not as well with outsiders. Hopefully, as we familiarize ourselves with Nekrasov Partition Function, we can read carefully and avoid dilemmas #1, #2 and #3.

Logically these `hep-th` papers have the following structure: **hat**, **cat**, **bat** have the same last two letters. Let's examine further:

- **b** + **at** = **bat**
- **c** + **at** = **cat**
- **h** + **at** = **hat**

Therefore, all words that end with "at" are the same. Including words like: **gate**, **chocolate** or **considerate**. These also rhyme.

Let's pick one a theory out of a hat. Wait better... Let's read Nekrasov himself.

$$Z = Z^{\text{tree}} \times Z^{\text{1-loop}} \times Z^{\text{inst}}$$

where we have removed the names of the paramters, since we don't know what they are.

- a is the adjoint Higgs field[1]
- m is the set of complex masses of matter multiplets (???)
- $\tau \in \mathbb{H}$ is the complexified gauge coupling, $q = e^{2\pi i \tau}$

The power series expansion $Z = \sum_k q^k Z_k$ is complicated since k is not a number.

[1] ... as in the "Higgs boson".

References

(1) Joseph Hayling, Constantinos Papageorgakis, Elli Pomoni, Diego Rodríguez-Gómez. **Exact Deconstruction of the 6D (2,0) Theory** arXiv:1704.02986

(2) Nikita Nekrasov **BPS/CFT correspondence: non-perturbative Dyson-Schwinger equations and qq-characters** arXiv:1512.0538

(3) Nikita Nekrasov **BPS/CFT correspondence II: Instantons at crossroads, Moduli and Compactness Theorem** arXiv:1608.07272

(4) Nikita Nekrasov **BPS/CFT Correspondence III: Gauge Origami partition function and qq-characters** arXiv:1701.00189