$e_i \pm e_j$ for all $i \neq j$. The free energy in the specific case of a vector multiplet in the adjoint, a single antisymmetric hypermultiplet, and N_f fundamental hypermultiplets then is

$$F(\lambda_i) = \sum_{i\neq j} \left[F_V(\lambda_i - \lambda_j) + F_V(\lambda_i + \lambda_j) + F_H(\lambda_i - \lambda_j) + F_H(\lambda_i + \lambda_j)\right] \\ + \sum_i \left[F_V(2\lambda_i) + F_V(-2\lambda_i) + N_f F_H(\lambda_i) + N_f F_H(-\lambda_i)\right] \quad (1)$$

The next step is to look for extrema of this function in the specific case of $\lambda_i \geq 0$ for all i. Extrema in the case of non-positive λ_i can be obtained from these through action of the Weyl group. To calculate the extrema, one first assumes that as $N \to \infty$, the vevs scale as $\lambda_i = N^\alpha x_i$ for $\alpha > 0$ and x_i of order $O(N^0)$. One then introduces a density function

$$\rho(x) = \frac{1}{N}\sum_{i=1}^{N} \delta(x - x_i) \quad (2)$$

which in the continuum limit should approach an L^1 function normalized as

$$\int dx\, \rho(x) = 1 \quad (3)$$

In terms of this density function, one finds that

$$F \approx -\frac{9\pi}{8}N^{2+\alpha}\int dxdy\, \rho(x)\rho(y)\left(|x-y| + |x+y|\right) + \frac{\pi(8-N_f)}{3}N^{1+3\alpha}\int dx\, \rho(x)\, |x|^3 \quad (4)$$

where the large argument expansions have been used, and terms subleading in N have been dropped. This only has non-trivial saddle points when both terms scale the same with N, which demands that $\alpha = 1/2$ and gives the famous result that $F \propto N^{5/2}$. Extremizing the free energy over normalized density functions then gives

$$F \approx -\frac{9\sqrt{2}\pi N^{5/2}}{5\sqrt{8-N_f}} \quad (5)$$

This value of the free energy is to be identified with the renormalized on-shell action of the supersymmetric AdS_6 solution. This identification yields the following relation between the six-dimensional Newton's constant G_6 and the parameters N and N_f of the dual SCFT,

$$G_6 = \frac{5\pi\sqrt{8-N_f}}{27\sqrt{2}}\, N^{-5/2} \quad (6)$$