In this Appendix we will be interested in theories with $\mathcal{N} = (2,0)$ supersymmetry in six dimensions. These theories (at the level of the local operator spectrum) are in one to one correspondence with the finite subgroups of $SU(2)$ [?, ?]. It is therefore common to label them of type $\mathfrak{g} = ADE$. Compactification of the theory of type $\mathfrak{g}$ on a circle with radius $\beta \to 0$ gives rise to the 5d $\mathcal{N} = 2$ SYM theory with gauge algebra $\mathfrak{g}$. It is conjectured that (atleast at the level of the BPS spectrum) that the 6d $\mathcal{N} = (2,0)$ theory of type $\mathfrak{g}$ on $\mathbb{S}^1_\beta \times \mathcal{M}_5$ is equivalent to the 5d $\mathcal{N} = 2$ theory with gauge algebra $\mathfrak{g}$ and gauge coupling $g^2_{\text{YM}} = 2\pi\beta$ on the compact 5-manifold $\mathcal{M}_5$. It is therefore believed that the $\mathcal{M}_5$ partition function for the 5d theory should reproduce the $\mathbb{S}^1_\beta \times \mathcal{M}_5$ partition function for the $\mathcal{N} = (2,0)$ theory. For the case $\mathcal{M}_5 = \mathbb{S}^5$ with $\mathfrak{g} = \mathfrak{u}(1), \mathfrak{u}(\infty)$, this conjecture has been supported for [?, ?] by matching the $\mathbb{S}^5$ partition functions to the superconformal index computations known from free field theory and AdS/CFT, respectively. There are also conjectures stating that a similar correspondence also holds between 6d $\mathcal{N} = (1,0)$ theories and 5d $\mathcal{N} = 1$ theories. For instance the $(1,0)$ theory on N M5-branes on transverse ADE singularities and 5d $\mathcal{N} = 1$ affine ADE shaped quivers with $U(N)$ gauge groups.

0.1 Superconformal Index