Recently, stimulated by [1], there has been much progress in the study of four-dimensional $\mathcal{N} = 2$ supersymmetric gauge theories in relation to two-dimensional topological field theories. Of particular interest, among many topics in this subfield, is the computation of the so-called superconformal index [2], or a partition function on $S^3 \times S^1$, in the 4-dim $\mathcal{N} = 2$ theories. In [3] the superconformal index is shown to be equivalent to the correlation functions in a 2-dim topological field theory. Further, in [4] computational techniques are developed to obtain the superconformal index of 4-dim $\mathcal{N} = 2$ theories which are furnished with certain supersymmetric defects.

In the article under review, the authors make further developments in the computation of the superconformal index for the theories with surface defects, including the ones that have not been considered in [4]. This result is obtained by studying algebraic features of a difference operator introduced in [4]. The authors also consider the difference operator from the two-dimensional perspective and interpret it in terms of 2-dim q-deformed Yang-Mills theory. Interested readers should also refer to a recent paper [5] where algebra of such a difference operator is further studied.

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