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Corrigendum

Corrigendum to “From Cauchy’s determinant formula to bosonic and fermionic immanant identities” [Eur. J. Comb. 110 (2023) 103683]

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We correct a definition in the paper [1] (no results get changed in their hypotheses or assertions). Specifically, in Definition 2.1, given a finite group G and a complex class function $\psi = \sum_{\chi \in \widehat{G}_{\mathbb{C}}} a_{\chi} \chi$ (so χ runs over the irreducible complex characters of G , and all $a_{\chi} \in \mathbb{C}$), we defined the ring of character values $R_{\psi} \subset \mathbb{C}$ to be the unital subring generated by all character values occurring in ψ :

$$R_{\psi} := \mathbb{Z}[\{\chi(g) : g \in G, a_{\chi} \neq 0\}] \subset \mathbb{C}.$$

This definition needs to be corrected, to also include the coefficients a_{χ} themselves. Thus, the correct definition is that R_{ψ} is the \mathbb{Z} -subalgebra of \mathbb{C} generated by

$$\{\chi(g) : g \in G, \chi \in \widehat{G}_{\mathbb{C}}, a_{\chi} \neq 0\} \cup \{a_{\chi} : \chi \in \widehat{G}_{\mathbb{C}}\}. \quad (0.1)$$

Note that this definition coincides with [1, Definition 2.1] if e.g. $\psi = \chi \in \widehat{G}_{\mathbb{C}}$ is a single irreducible character, or more generally a virtual character (i.e., all $a_{\chi} \in \mathbb{Z}$), e.g. the character of any finite-dimensional representation.

Given this revised definition, we next discuss the results in the paper, and which of them are affected.

- (1) Our main result for bosonic variables, [1, Theorem 2.2], involved a multiplicity-free character (i.e., all $a_{\chi} = 0, 1$), hence is unaffected by the revised definition of R_{ψ} above.

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- (2) Similarly, our main result for fermionic variables, [1, Theorem 3.1] is also unaffected by the revised definition above – provided that ψ is a multiplicity-free character, or even virtual character.

These two results were true without any corrections to the paper, even before this erratum.

- (3) For general complex class functions ψ , the bosonic and fermionic variants of our results (see Corollary 2.3 and Theorem 3.1 in [1]) need to be formulated over an R_ψ -algebra; and this is where the previous definition of R_ψ does not suffice. In order to act by a_χ on the ground ring, one needs to include the coefficients a_χ in the ring of character values – i.e., the revised definition of R_ψ in (0.1) should be used.

In other words, both the hypotheses and the assertions in the aforementioned two results remain unchanged – only the definition of R_ψ gets updated.

The remaining results in the paper are unaffected, in both their hypotheses and their assertions.

References

- [1] Apoorva Khare, Siddhartha Sahi, From Cauchy's determinant formula to bosonic and fermionic immanant identities, European J. Combin. 110 (2023) #103683 (16 pp.), <http://dx.doi.org/10.1016/j.ejc.2022.103683>.