



On Homogeneous Polynomials Determined by their Partial Derivatives – CORRIGENDUM

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This is a corrigendum for the proof of [3, Lemma 2.5]. We follow the notations in [3]. In Step 2 of the proof of [3, Lemma 2.5], we claimed that for the homogeneous polynomial $g = \sum_{|I|=k} x^{2I} \in \mathbb{C}[x_0, \dots, x_n]_{2k}$, the matrix

$$\mathbf{S}(g) = (\mathbf{S}(g)_{I,I'})_{|I|=|I'|=k}$$

is a diagonal matrix whose (I, I) -entry is $(2I)!$, where $\mathbf{S}(g)_{I,I'} = D_{I+I'}g$. This is incorrect since, for instance, when $n = 1$ and $k = 2$, we have

$$\mathbf{S}(g)_{(2,0),(0,2)} = D_{(2,0)+(0,2)}g = D_{2(1,1)}g = (2(1,1))! = 4 \neq 0.$$

Therefore, our proof of [3, Lemma 2.5] is not correct.

In fact, the result stated in [3, Lemma 2.5] has already appeared in [2, Section 3, p. 165] as well as in [1, Proposition 3.4]. We leave it to the interested reader to translate the result from one set of notations used in [3] to the others used in [1, 2].

References

- [1] A. Iarrobino, *Compressed algebras: Artin algebras having given socle degrees and maximal length*. Trans. Amer. Math. Soc. 285(1984), 337–378.
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