# ERRATA TO "FOUNDATIONS FOR A THEORY OF COMPLEX MATROIDS"

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*Note.* The page numbering refers to the published version [1]. The section numbering in the ArXived version (arXiv:1005.3560) is off by one: what we refer here as Lemma 4.5 is Lemma 3.5 in the ArXived version, and so on.

- p. 811, Definition 2.4: in Axiom ($\mathcal{C}1$), $\mathrm{supp}(X) = \mathrm{supp}(Y)$ should be replaced with $\mathrm{supp}(X) \subseteq \mathrm{supp}(Y)$. Also, there should be an additional axiom that the zero vector is not in $\mathcal{C}$.
- p. 818, statement of Lemma 3.4: the domain of the function $\phi \backslash A$ should be $(E \backslash A)^r$.
- p. 821, second displayed equation: $\frac{X(x_k)Y(x_k)}{X(x_1)Y(y_1)}$ should be $\frac{X(x_k)Y(y_1)}{X(x_1)Y(x_k)}$. The following sentence should say *"Multiplying all elements of this set by* $\frac{X(x_1)}{Y(y_1)}$*..."*
- p. 822, first bulleted point: $b_0$ should be $b_1$.
- p. 822, statement of Lemma 4.5 and p. 823, statement of Lemma 4.6: The hypothesis should be that $\mathcal{C}$ and $\mathcal{D}$ form a dual pair of complex circuit signatures of a matroid $M$.
- p. 823, first commutative diagram: the label on the diagonal should be $\frac{X_{e,g}(g)}{X_{e,g}(e)}$.
- p. 825, third displayed expression: $\gamma(B_1, B_2)$ should be $(-1)^{i+j-1}\gamma(B_1, B_2)$, where $e$ and $f$ are respectively $i$th and $j$th in the >- ordering of $B_1 \cup \{f\}$.
- p. 825, fourth displayed expression: both occurrences of $(-1)^{i-j}$ should be $(-1)^{i-j+1}$.
- p. 827, Lemma 5.2: the proof is incorrect: the assertion that $f \notin \mathrm{cl}(A \cup B)$ is not necessarily true. Fortunately, Lemma 5.2 is never actually used! (The statement of this lemma is, "a posteriori", correct, since it holds in any matroid: ompare, e.g., [2, p. 15, Exercise 14]).
- p. 827 statement of Lemma 5.3: $X(f) \neq Y(f)$ should be $X(f) \neq -Y(f)$.
- p. 827, first line of proof – strictly speaking one should not at this point refer to "the complex matroid defined by $\varphi$", since it is not yet known that this is a complex matroid.
- p. 827, last complete paragraph: in the last sentence, the elements of $A$ should be $a_3, \ldots, a_d$, not $a_2, \ldots, a_d$. Also, in the following sentence "complementary to the hyperplane $E \backslash \mathrm{cl}(A \cup \{e\})$" should be "with support $E \backslash \mathrm{cl}(A \cup \{e\})$".
- p. 829, statement of Lemma 5.4: $X(f) \neq Y(f)$ should be $X(f) \neq -Y(f)$.
- p. 829, proof of Lemma 5.4: in the first sentence of the third paragraph, $\mathrm{supp}(X) \cup \mathrm{supp}(Y)$ should be $(\mathrm{supp}(X) \cup \mathrm{supp}(Y)) \backslash e$.

- p. 829, proof of Lemma 5.4: in the last paragraph $X(f) \neq Y(f) = Y'(f)$ should be $X(f) \neq -Y(f) = -Y'(f)$.
- p. 831, Figure 3: The labels are correct only when $W(e) = W(f) = W(g) = 1$. For all other $W$ each expression needs an appropriate denominator.
- p. 831, last paragraph of proof of Proposition 5.6: $W \in \mathcal{D}\backslash e$ should be $W\backslash e \in \mathcal{D}\backslash e$. Also, it has been pointed out to us that the last part of the proof is confusing. A more complete way to end the proof is to replace the last sentence with the following. *"Letting $S_f := \mathrm{supp}(X') \cap \mathrm{supp}(W)$, we conclude that for every $f \in \mathrm{supp}(X) \cap \mathrm{supp}(W)$ there is a subset $S_f$ of $\mathrm{supp}(X) \cap \mathrm{supp}(W)$ containing $f$ so that $0 \in \mathrm{pconv}\{\frac{X(g)}{W(g)} : g \in S_f\}$. Thus $X \perp W$, contradicting our assumption."*
- p. 833. In the third displayed equation $\frac{3}{2} - \frac{1}{2}$ should be $\frac{3}{2} - \frac{i}{2}$, and in the fourth displayed equation $-1 + \frac{1}{2}$ should be $-1 + \frac{i}{2}$.
- p. 835, statement of Proposition 7.3: "and let $\varphi_1$ and $\varphi_2$ be their duals" should be "and let $\varphi_1^*$ and $\varphi_2^*$ be their duals".
- p. 838, Definition A.1.3: Axiom ($\mathbf{C}2$) should read *"If $C_1, C_2 \in \mathbf{C}$ are distinct and there are elements $e, f \in E$ with $e \in C_1 \cap C_2$ and $f \in C_1\backslash C_2$ then there is $C_3 \in \mathbf{C}$ with $f \in C_3 \subseteq (C_1 \cup C_2)\backslash e$"*.
- p. 839, Definition A.2: "meet" should be "join".

## References

[1] Laura Anderson and Emanuele Delucchi. *Foundations for a theory of complex matroids.* Discrete and Computational Geometry, 48(4):807846, 2012.

[2] James Oxley. *Matroid Theory.* Oxford Science Publications. The Clarendon Press Oxford University Press, New York, 1992.

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