ERRATA TO CYCLIC RESULTANTS

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1. Errata

In Theorem 1.1 of [1], a characterization was given for when two univariate polynomials share the same sequence of nonzero cyclic resultants. As pointed out to me by Ignacio Fernández Rúa [2], this description is partially incomplete. The corrected statement should be given as follows.

Theorem 1.1. *Let f and g be polynomials in $\mathbb{C}[x]$. Then, f and g generate the same sequence of nonzero cyclic resultants if and only if there exist $u, v \in \mathbb{C}[x]$ with $u(0) \neq 0$ and nonnegative integers l_1, l_2 such that $\deg(u) \equiv l_2 - l_1 \pmod 2$, and*

$$\begin{aligned} f(x) &= (-1)^{l_2 - l_1} x^{l_1} v(x) u(x^{-1}) x^{\deg(u)} \\ g(x) &= x^{l_2} v(x) u(x). \end{aligned}$$

This change does not affect any of the other results in [1]. The cause for the missing case (when $l_1 \not\equiv l_2 \pmod 2$) stems from a minor miscalculation of the divisor of a certain rational function. For completeness, we state the correction here. All of the following equation references are taken from [1]. Let $f = x^l h \in \mathbb{C}[x]$ in which $h(0) \neq 0$ and h has degree d. Then, from (3.2), the cyclic resultants of f are given by $(-1)^l r_m(h)$. Examining equation (3.4) following Corollary 3.3, it follows that the divisor of G_d for f is given by the divisor of the rational function

$$\exp\left(-\sum_{m=1}^{\infty} r_m(f) \frac{z^m}{m}\right) = \left[\exp\left(-\sum_{m=1}^{\infty} r_m(h) \frac{z^m}{m}\right)\right]^{(-1)^l}.$$

Let $\alpha_1, \ldots, \alpha_d$ be the roots of h. By the discussion for polynomials without roots of zero found at the beginning of Section 4, it follows that the divisor of G_d for f is

$$(-1)^l \left[a_0^{-1}\right] \prod_{i=1}^{d} \left(\left[\alpha_i^{-1}\right] - [1]\right).$$

With this correction in hand, it is straightforward to modify the proof of Theorem 1.1 and derive the missing case in the characterization.

References

[1] C. Hillar, *Cyclic resultants*, J. Symb. Comp. **39** (2005), 653-669.
[2] I.F. Rúa, private communication, 2005.

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