

Correction

# Correction: Alsaedi, A., et al. Existence and Stability Results for a Fractional Order Differential Equation with Non-Conjugate Riemann–Stieltjes Integro-Multipoint Boundary Conditions. *Mathematics* 2019, 7, 249

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In [1], the authors wish to make the following corrections.

1. Throughout the original paper, the co-efficient of  $g_3(t)$  (see (5), (21), (28), proof of Theorem 6) is

$$\int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} \widehat{f}(u) du \right) dA(s).$$

It should be

$$\left[ \sum_{i=1}^{n-2} \alpha_i \int_a^{\eta_i} \frac{(\eta_i-s)^{q-1}}{\Gamma(q)} \widehat{f}(s) ds + \int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} \widehat{f}(u) du \right) dA(s) \right].$$

2. In (15) of the original paper, it was

$$I_3 = \int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} \widehat{f}(u) du \right) dA(s).$$

It should be

$$I_3 = \sum_{i=1}^{n-2} \alpha_i \int_a^{\eta_i} \frac{(\eta_i-s)^{q-1}}{\Gamma(q)} \widehat{f}(s) ds + \int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} \widehat{f}(u) du \right) dA(s).$$

3. Throughout the original paper, the coefficient of  $\bar{g}_3$  (for instance, see (19), proofs of Theorems 2, 4, 6, and 7) is  $\int_a^b \frac{(s-a)^q}{\Gamma(q+1)} dA(s)$ . It should be

$$\left[ \sum_{i=1}^{n-2} |\alpha_i| \frac{(\eta_i-a)^q}{\Gamma(q+1)} + \int_a^b \frac{(s-a)^q}{\Gamma(q+1)} dA(s) \right].$$

The coefficient of  $\frac{|(g_3(t_2) - g_3(t_1))|}{\Gamma(q+1)}$  in the proof of Theorem 2 is  $\int_a^b \left( \int_a^s (s-a)^q dA(s) \right)$ . It should be

$$\left[ \sum_{i=1}^{n-2} |\alpha_i| (\eta_i-a)^q + \int_a^b (s-a)^q dA(s) \right].$$

- Throughout the original paper, the co-efficient of  $|g_3(t)|$  (see proofs of Theorems 2, 4, 6, and 7) and  $|g_3(t_2) - g_3(t_1)|$  in the proof Theorem 2 is

$$\int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} |f(u, x(u))| du \right) dA(s).$$

It should be

$$\left[ \sum_{i=1}^{n-2} |\alpha_i| \int_a^{\eta_i} \frac{(\eta_i - s)^{q-1}}{\Gamma(q)} |f(s, x(s))| ds + \int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} |f(u, x(u))| du \right) dA(s) \right].$$

- In the proofs of Theorems 6 and 7, the coefficient of  $|g_3(t)|$  is

$$\int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} |f(u, x(u)) - f(u, y(u))| du \right) dA(s).$$

It should be

$$\left[ \sum_{i=1}^{n-2} |\alpha_i| \int_a^{\eta_i} \frac{(\eta_i - s)^{q-1}}{\Gamma(q)} |f(s, x(s)) - f(s, y(s))| ds + \int_a^b \left( \int_a^s \frac{(s-u)^{q-1}}{\Gamma(q)} |f(u, x(u)) - f(u, y(u))| du \right) dA(s) \right].$$

- In Example 2,  $\Lambda \approx 0.243646$ ,  $\zeta\Lambda \approx 0.097458 < 1$  in the original paper. These values should be  $\Lambda \approx 0.261226$ ,  $\zeta\Lambda \approx 0.104490 < 1$ .
- In Example 3 of the original paper,  $\Lambda \approx 0.272140$ ,  $\Lambda - \frac{(b-a)^q}{\Gamma(q+1)} \approx 0.204166$  and  $\delta < 14.693960$ . The corrected values of these parameters are  $\Lambda \approx 0.326742$ ,  $\Lambda - \frac{(b-a)^q}{\Gamma(q+1)} \approx 0.258768$  and  $\delta < 11.5$ .
- In Example 4,  $\delta < 11.023738$  in the original paper. It should be  $\delta < 9.1$ .
- In Example 5,  $L\Lambda \approx 0.102053$ . It should be  $L\Lambda \approx 0.097959$ .
- In the Conclusions, the coefficient of  $\bar{g}_3$  is  $\frac{(b-a)^{q+1}}{\Gamma(q+2)}$ . It should be

$$\sum_{i=1}^{n-2} |\alpha_i| \frac{(\eta_i - a)^q}{\Gamma(q+1)} + \frac{(b-a)^{q+1}}{\Gamma(q+2)}.$$

The authors would like to apologize for any inconvenience caused to the readers by these changes.

**References**

- Ahmad, B.; Alruwaily Y.; Alsaedi, A.; Ntouyas, S.K. Existence and Stability Results for a Fractional Order Differential Equation with Non-Conjugate Riemann-Stieltjes Integro-Multipoint Boundary Conditions. *Mathematics* **2019**, *7*, 249. [[CrossRef](#)]



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