

Erratum to “Relationships Between the Zeros, Weights, and Weight Functions of Orthogonal Polynomials: Derivative Rule Conjecture (the DRC) Applied to Stieltjes and Spectral Imaging”

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This erratum contains corrections for the above-mentioned article.¹

- 1) On page 56, Abstract, “were” should be corrected to “where” as below:

Zeros, $x[k, N]$, $k = 1 \dots N$, of orthogonal polynomials are useful for numerical applications, e.g., Gaussian quadrature where combined with quadrature weights, $w[k, N]$, integrals with weight function $\rho(x)$ are performed to high precision.

- 2) On page 57, Equation (4), “ $n = 0, 1, 2$ ” should be corrected to “ $n = 0, 1, 2, \dots$ ”
- 3) On page 63, Appendix A, “For = 0” should be corrected to “For $l = 0$ ”
- 4) On page 63, corrections to the **Equations in Appendix B are below.**

FIRST KIND

$$\begin{aligned} x_1[k, N] &= -\text{Cos}((2k - 1)\pi/(2N)) \\ x_1'[k, N] &= (\pi/N)\text{Sin}((2k - 1)\pi/(2N)) \\ &= (\pi/N)\sqrt{(1 - x_1[k, N]^2)} \end{aligned}$$

$$\begin{aligned} w_1[k, N] &= \pi/N \\ \rho_1(x_1[k, N]) &= w_1[k, N]/x_1'[k, N] \\ &= 1/\sqrt{(1 - x_1[k, N]^2)} \end{aligned} \quad (\text{B1})$$

SECOND KIND

$$\begin{aligned} x_2[k, N] &= -\text{Cos}((k\pi)/(N + 1)) \\ x_2'[k, N] &= (\pi/(N + 1))\text{Sin}((k\pi)/(N + 1)) \\ &= (\pi/(N + 1))\sqrt{(1 - x_2[k, N]^2)} \end{aligned}$$

$$\begin{aligned} w_2[k, N] &= (\pi/(N + 1))\text{Sin}^2((k\pi)/(N + 1)) \\ \rho_2(x_2[k, N]) &= w_2[k, N]/x_2'[k, N] \\ &= \sqrt{(1 - x_2[k, N]^2)} \end{aligned} \quad (\text{B2})$$

REFERENCE

1. W. P. Reinhardt, “Relationships between the zeros, weights, and weight functions of orthogonal polynomials: Derivative rule conjecture (the DRC) applied to Stieltjes and spectral imaging,” *Comput. Sci. Eng.*, vol. 23, no. 3, pp. 56–64, May/June 2021, doi: 10.1109/MCSE.2021.3065027.