Some Orthogonal Polynomials on the Finite Interval and Gaussian Quadrature Rules for Fractional Riemann-Liouville Integrals

Gradimir Milovanovic[1]

[1]Serbian Academy of Sciences and Arts

June 19, 2020

Abstract

Inspired by papers by M.A. Bokhari, A. Qadir, and H. Al-Attas [On Gauss-type quadrature rules, Numer. Funct. Anal. Optim. 31 (2010), 1120-1134] and by M.R. Rapaic, T.B. Sekara, and V. Govedarica [A novel class of fractionally orthogonal quasi-polynomials and new fractional quadrature formulas, Appl. Math. Comput. 245 (2014), 206-219], in this paper we investigate a few types of orthogonal polynomials on finite intervals and derive the corresponding quadrature formulas of Gaussian type for efficient numerical computation of the left and right fractional Riemann-Liouville integrals. Several numerical examples are included to demonstrate the numerical efficiency of the proposed procedure.

Hosted file

`gvm-2020.pdf` available at https://authorea.com/users/335199/articles/461056-some-orthogonal-polynomials-on-the-finite-interval-and-gaussian-quadrature-rules-for-fractional-riemann-liouville-integrals

figures/wBa/wBa-eps-converted-to.pdf

figures/Fxcs/Fxcs-eps-converted-to.pdf

figures/fxcf/fxcf-eps-converted-to.pdf

figures/wL05do10/wL05do10-eps-converted-to.pdf

figures/bkoef1002/bkoef1002-eps-converted-to.pdf
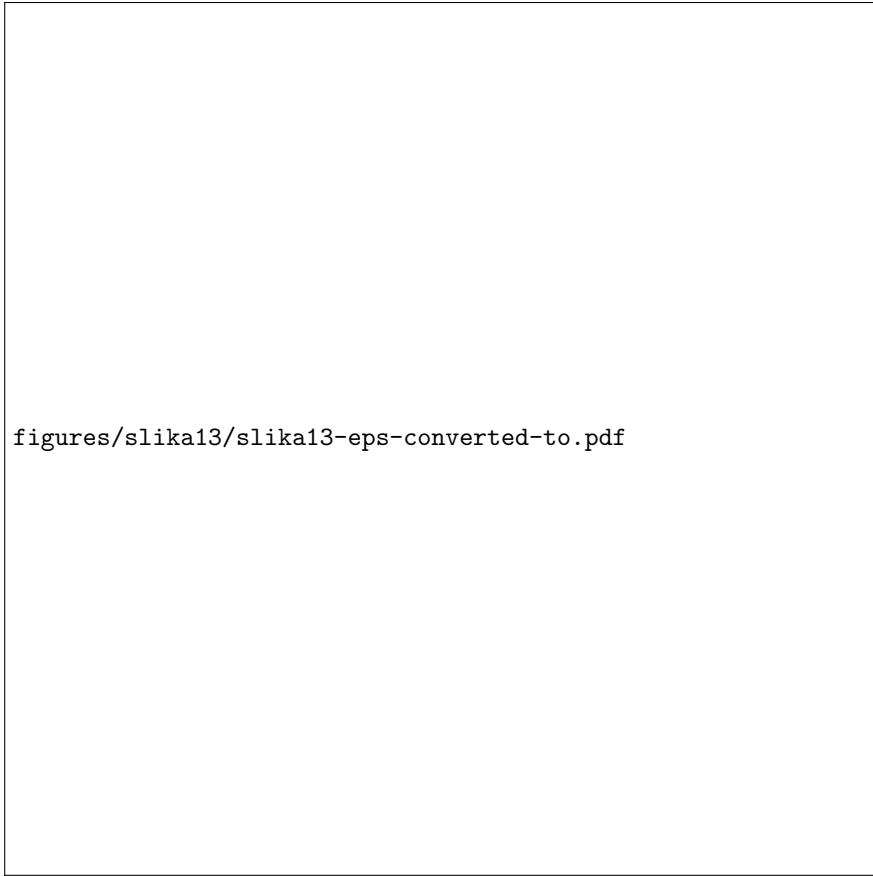
figures/bkoef1006/bkoef1006-eps-converted-to.pdf
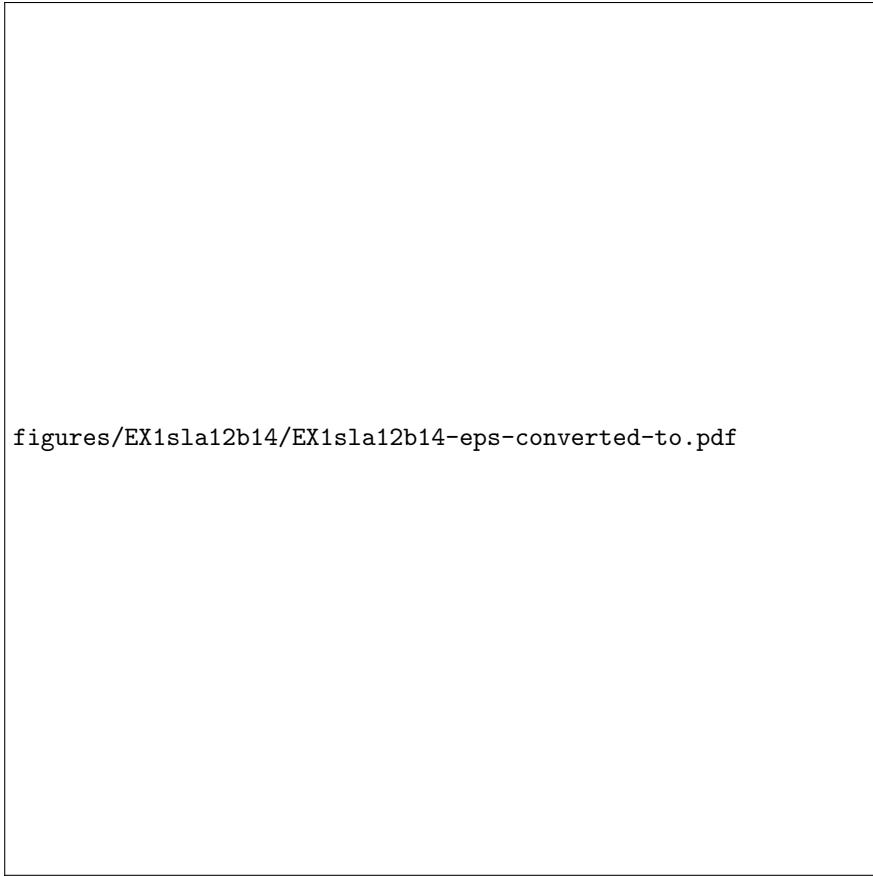
figures/EX1new/EX1new-eps-converted-to.pdf

figures/grn5GL02505/grn5GL02505-eps-converted-to.pdf

figures/compGL02505/compGL02505-eps-converted-to.pdf
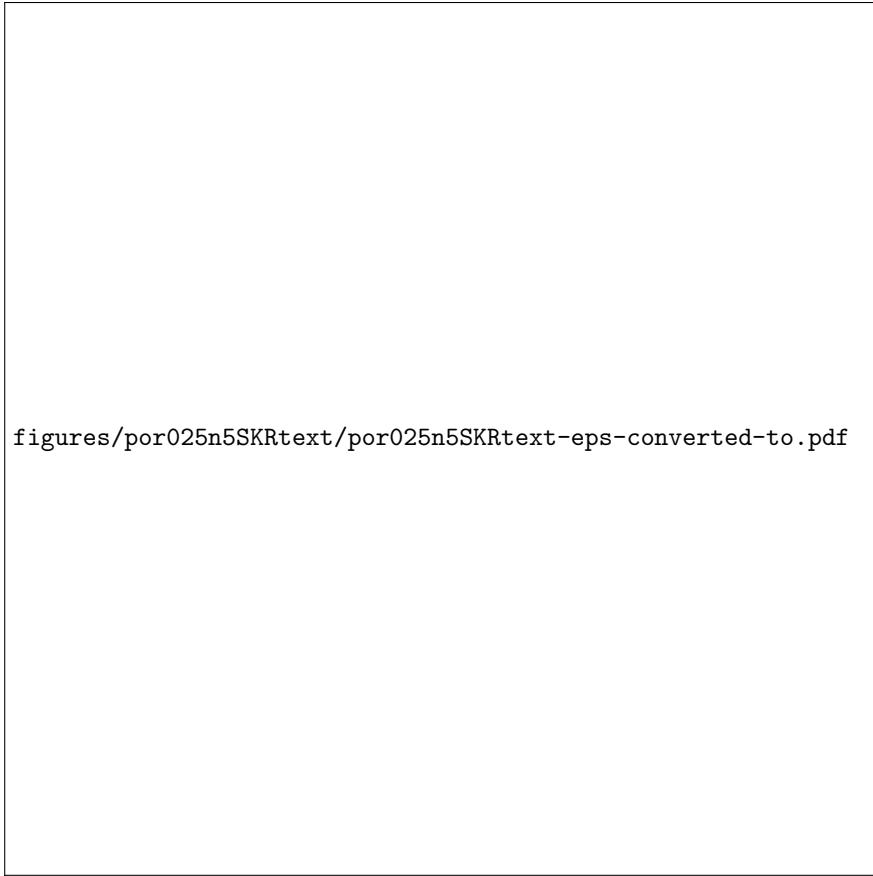
figures/EX1sla14b1/EX1sla14b1-eps-converted-to.pdf

figures/slika13/slika13-eps-converted-to.pdf

figures/EX1sla12b14/EX1sla12b14-eps-converted-to.pdf

figures/ex2an5/ex2an5-eps-converted-to.pdf

figures/Ex2aA025/Ex2aA025-eps-converted-to.pdf

figures/por025n5SKRtext/por025n5SKRtext-eps-converted-to.pdf

figures/poraj025/poraj025-eps-converted-to.pdf

figures/FrInt3/FrInt3-eps-converted-to.pdf

figures/EX3GuRada025b05/EX3GuRada025b05-eps-converted-to.pdf