Bibliography

[1] N.H. Abel, "Oplösning af et par opgaver ved hjelp af bestemte integraler," *Magazin for naturvidenskaberne*, vol. 2, no. 2, 1823.

[2] K. Oldham and J. Spanier, *The fractional calculus theory and applications of differentiation and integration to arbitrary order.* Elsevier, 1974.

[3] S. G. Samko, A. A. Kilbas, and O. M. Marichev, *Fractional integrals and derivatives.* Gordon and Breach Science Publishers, 1993.

[4] K. Miller and B. Ross, "An introduction to the fractional calculus and fractional differential equations," 1993.

[5] I. Podlubny, *Fractional differential equations: an introduction to fractional derivatives, fractional differential equations, to methods of their solution and some of their applications.* Elsevier, 1998.

[6] E. Pitcher and W. Sewell, "Existence theorems for solutions of differential equations of non-integral order," *Bulletin of the American Mathematical Society*, vol. 44, no. 2, pp. 100–107, 1938.

[7] R. Hilfer, *Applications of fractional calculus in physics.* World scientific, 2000.

[8] R. L. Magin, *Fractional calculus in bioengineering.* Begell House Redding, 2006.

[9] C. M. Pinto and A. R. Carvalho, “A latency fractional order model for hiv dynamics,” *Journal of Computational and Applied Mathematics*, vol. 312, pp. 240–256, 2017.

[10] M. M. Meerschaert and A. Sikorskii, *Stochastic models for fractional calculus.* Walter de Gruyter GmbH & Co KG, vol. 43, 2019.

[11] B. P. Rao, *Statistical inference for fractional diffusion processes.* John Wiley & Sons, 2011.

[12] E. Scalas, R. Gorenflo, and F. Mainardi, “Fractional calculus and continuous-time finance,” *Physica A: Statistical Mechanics and its Applications*, vol. 284, pp. 376–384, 2000.

[13] M. D. Ortigueira, *Fractional calculus for scientists and engineers.* Springer Science & Business Media, vol. 84, 2011.

[14] D. Valério, J. Machado, and V. Kiryakova, “Some pioneers of the applica- tions of fractional calculus,” *Fractional Calculus and Applied Analysis*, vol. 17, no. 2, pp. 552–578, 2014.

[15] H. Sun, Y. Zhang, D. Baleanu, W. Chen, and Y. Chen, “A new collection of real world applications of fractional calculus in science and engineering,” *Communications in Nonlinear Science and Numerical Simulation*, vol. 64, pp. 213–231, 2018.

[16] A. A. Kilbas, H. M. Srivastava, and J. J. Trujillo, *Theory and applications of fractional differential equations.* Elsevier, vol. 204, 2006.

[17] O. P. Agrawal, “Generalized variational problems and Euler–Lagrange equations,” *Computers & Mathematics with Applications*, vol. 59, no. 5, pp. 1852–1864, 2010.

[18] Y. Luchko, "Operational calculus for the general fractional derivative and its applications," *Fractional Calculus and Applied Analysis*, vol. 24, no. 2, pp. 338–375, 2021.

[19] Y. Luchko, "Fractional derivatives and the fundamental theorem of fractional calculus," *Fractional Calculus and Applied Analysis*, vol. 23, no. 4, pp. 939–966, 2020.

[20] M. M. Meerschaert, Y. Zhang, and B. Baeumer, "Tempered anomalous diffusion in heterogeneous systems," *Geophysical Research Letters*, vol. 35, no. 17, 2008.

[21] M. Zayernouri, M. Ainsworth, and G. E. Karniadakis, "Tempered fractional sturm–liouville eigenproblems," *SIAM Journal on Scientific Computing*, vol. 37, no. 4, pp. A1777–A1800, 2015.

[22] R. K. Pandey and O. P. Agrawal, "Numerical scheme for a quadratic type generalized isoperimetric constraint variational problems with A-operator," *Journal of Computational and Nonlinear Dynamics*, vol. 10, no. 2, pp. 021003, 2015.

[23] T. R. Prabhakar, "A singular integral equation with a generalized Mittag-Leffler function in the kernel," *Yokohama Mathematical Journal*, vol. 19, no. 1, pp. 7–15, 1971.

[24] A. Giusti, "General fractional calculus and Prabhakar's theory," *Communications in Nonlinear Science and Numerical Simulation*, vol. 83, pp. 105114, 2020.

[25] R. Garra and R. Garrappa, "The Prabhakar or three parameter Mittag–Leffler function: Theory and application," *Communications in Nonlinear Science and Numerical Simulation*, vol. 56, pp. 314–329, 2018.

[26] S. Kesavan and V. Kalashnikov, "Topics in functional analysis and applications," *Acta Applicandae Mathematicae*, vol. 37, no. 3, pp. 311–311, 1994.

[27] D. Boffi, "Finite element approximation of eigenvalue problems," *Acta Numerica*, vol. 19, pp. 1–120, 2010.

[28] V. J. Ervin and J. P. Roop, "Variational formulation for the stationary fractional advection dispersion equation," *Numerical Methods for Partial Differential Equations: An International Journal*, vol. 22, no. 3, pp. 558–576, 2006.

[29] W. O. Amrein, A. M. Hinz, and D. B. Pearson, *Sturm-Liouville theory: past and present*. Springer Science & Business Media, 2005.

[30] A. Zettl, *Sturm-liouville theory*. American Mathematical Soc., no. 121, 2005.

[31] C. Sturm, *Mémoire sur les équations différentielles linéaires du second ordre*. Springer, 2009.

[32] J. Lützen and A. Mingarelli, *Charles françois Sturm and differential equations*. Springer, pp. 25–47, 2009.

[33] J. Lützen, *Joseph Liouville 1809–1882: Master of pure and applied mathematics*. Springer Science & Business Media, vol. 15, 2012.

[34] M. Al-Gwaiz, *Sturm-Liouville theory and its applications*. Springer, vol. 264, 2008.

[35] G. Freiling and V. A. Yurko, *Inverse Sturm-Liouville problems and their applications*. NOVA Science Publishers Huntington, 2001.

[36] V. A. Marchenko, *Sturm-Liouville operators and applications*. American Mathematical Soc., vol. 373, 2011.

[37] Q. M. Al-Mdallal, "An efficient method for solving fractional Sturm-Liouville problems," *Chaos, Solitons and Fractals*, vol. 40, no. 1, pp. 183–189, 2009.

[38] Q. M. Al-Mdallal, "On the numerical solution of fractional Sturm–Liouville problems," *International Journal of Computer Mathematics*, vol. 87, no. 12, pp. 2837–2845, 2010.

[39] S. Abbasbandy and A. Shirzadi, "Homotopy analysis method for multiple solutions of the fractional Sturm-Liouville problems," *Numerical Algorithms*, vol. 54, no. 4, pp. 521–532, 2010.

[40] M. Klimek and O. P. Agrawal, "On a regular fractional Sturm-Liouville problem with derivatives of order in (0, 1)," in *Proceedings of the 13th International Carpathian Control Conference (ICCC).* IEEE, pp. 284–289, 2012.

[41] M. Klimek and O.P. Agrawal, "Regular fractional Sturm-Liouville problem with generalized derivatives of order in (0, 1)," *IFAC Proceedings Volumes*, vol. 46, no. 1, pp. 149–154, 2013.

[42] M. Klimek and O. P. Agrawal, "Fractional Sturm–Liouville problem," *Computers & Mathematics with Applications*, vol. 66, no. 5, pp. 795–812, 2013.

[43] M. Rivero, J. Trujillo, and M. Velasco, "A fractional approach to the Sturm-Liouville problem," *Open Physics*, vol. 11, no. 10, pp. 1246–1254, 2013.

[44] M. Zayernouri and G. Karniadakis, "Fractional Sturm-Liouville eigen- problems theory and numerical approximation," *Journal of Computational Physics*, vol. 252, pp. 495–517, 2013.

[45] T. Blaszczyk and M. Ciesielski, "Numerical solution of fractional Sturm-Liouville equation in integral form," *Fractional Calculus and Applied Analysis*, vol. 17, pp. 307–320, 2014.

[46] M. Klimek, T. Odzijewicz, and A. B. Malinowska, "Variational methods for the fractional sturm-liouville problem," *Journal of Mathematical Analysis and Applications*, vol. 416, no. 1, pp. 402–426, 2014.

[47] P. Ghelardoni and C. Magherini, "A matrix method for fractional sturm-liouville problems on bounded domain," *Advances in Computational Mathematics*, vol. 43, no. 6, pp. 1377–1401, 2017.

[48] J. Li and J. Qi, "Eigenvalue problems for fractional differential equations with right and left fractional derivatives," *Applied Mathematics and Computation*, vol. 256, pp. 1–10, 2015.

[49] H. Khosravian-Arab, M. Dehghan, and M. Eslahchi, "Fractional Sturm-Liouville boundary value problems in unbounded domains: Theory and applications," *Journal of Computational Physics*, vol. 299, pp. 526–560, 2015.

[50] A. M. El-Sayed and F. M. Gaafar, *Existence and uniqueness of solution for Sturm–Liouville fractional differential equation with multi-point boundary condition via Caputo derivative.* Springer, vol. 2019, pp. 1–17, 2019.

[51] M. H. Derakhshan and A. Ansari, "Numerical approximation to Prabhakar fractional Sturm–Liouville problem," *Computational and Applied Mathematics*, vol. 38, pp. 1–20, 2019.

[52] M. Dehghan and A. B. Mingarelli, "Fractional Sturm-Liouville eigenvalue problems, I. Revista de la Real Academia de Ciencias Exactas," *Físicas y Naturales. Serie A. Matemáticas*, vol. 114, no. 2, pp. 46, 2020.

[53] V. Ertürk, "Computing eigenelements of Sturm-Liouville problems of fractional order via fractional differential transform method," *Mathematical and Computational Applications*, vol. 16, no. 3, pp. 712–720, 2011.

[54] M. Klimek, M. Ciesielski, and T. Blaszczyk, “Exact and numerical solution of the fractional Sturm–Liouville problem with Neumann boundary conditions,” *Entropy*, vol. 24, no. 2, p. 143, 2022.

[55] Q. M. Al-Mdallal, M. Al-Refai, M. Syam, and M. K. Al-Srihin, “Theoretical and computational perspectives on the eigenvalues of fourth-order fractional Sturm–Liouville problem,” *International Journal of Computer Mathematics*, vol. 95, no. 8, pp. 1548–1564, 2018.

[56] M. K. Sadabad and A. J. Akbarfam, “An efficient numerical method for estimating eigenvalues and eigenfunctions of fractional Sturm–Liouville problems,” *Mathematics and Computers in Simulation*, vol. 185, pp. 547–569, 2021.

[57] B. Jin, R. Lazarov, J. Pasciak, and W. Rundell, “A finite element method for the fractional Sturm-Liouville problem,” *arXiv preprint arXiv:1307.5114*, 2013.

[58] B. S. Kashkari and M. I. Syam, “An accurate method for solving a class of fractional Sturm-Liouville eigenvalue problems,” *Results in Physics*, vol. 9, pp. 560–569, 2018.

[59] V. E. Tarasov, “Review of some promising fractional physical models,” *International Journal of Modern Physics B*, vol. 27, no. 09, p. 1330005, 2013.

[60] O. P. Agrawal, “Generalized multiparameters fractional variational calculus,” *International Journal of Differential Equations*, vol. 2012, no. 1, pp. 521750, 2012.

[61] O. P. Agrawal, “Some generalized fractional calculus operators and their applications in integral equations,” *Fractional Calculus and Applied Analysis*, vol. 15, pp. 700–711, 2012.

[62] S. A. Yousefi, M. Dehghan, and A. Lotfi, "Generalized Euler–Lagrange equations for fractional problems with free boundary conditions," *Computers & Mathematics with Applications*, vol. 62, no. 3, pp. 987–995, 2011.

[63] T. Odzijewicz, A. B. Malinowska, and D. F. Torres, "Fractional calculus of variations in terms of a generalized fractional integral with applications to physics," in *Abstract and Applied Analysis*, vol. 2012, no. SI12, pp. 1–24, 2012.

[64] R. Garra, R. Gorenflo, F. Polito, and Ž. Tomovski, "Hilfer–Prabhakar derivatives and some applications," *Applied mathematics and computation*, vol. 242, pp. 576–589, 2014.

[65] S. Yadav, R. K. Pandey, and P. K. Pandey, "Numerical approximation of tempered fractional Sturm-Liouville problem with application in fractional diffusion equation," *International Journal for Numerical Methods in Fluids*, vol. 93, no. 3, pp. 610–627, 2021.

[66] X. Li and C. Xu, "A space-time spectral method for the time fractional diffusion equation," *SIAM Journal on Numerical Analysis*, vol. 47, pp. 2131, 2009.

[67] M. Ciesielski, M. Klimek, and T. Blaszczyk, "The fractional Sturm–Liouville problem—Numerical approximation and application in fractional diffusion," *Journal of computational and applied mathematics*, vol. 317, pp. 573–588, 2017.

[68] M. Klimek, A. Malinowska, and T. Odzijewicz, "Applications of the fractional Sturm-Liouville problem to the space-time fractional diffusion in a finite domain," *Fract. Calc. Appl. Anal*, vol. 19, no. 2, pp. 516–550, 2016.

[69] M. Klimek, *Fractional Sturm-Liouville Problem and 1D space-time fractional diffusion with mixed boundary conditions.* American Society of Mechanical Engineers, vol. 57199, 2015.

[70] Y. Xu and O. P. Agrawal, "Numerical solutions and analysis of diffusion for new generalized fractional advection-diffusion equations," *Central European Journal of Physics*, vol. 11, pp. 1178–1193, 2013.

[71] Y. Xu and O. P. Agrawal, "Models and numerical schemes for generalized Van der Pol equations," *Communications in Nonlinear Science and Numerical Simulation*, vol. 18, no. 12, pp. 3575–3589, 2013.

[72] Y. Xu and O. P. Agrawal, "Models and numerical solutions of generalized oscillator equations," *Journal of Vibration and Acoustics*, vol. 136, no. 5, pp. 050903, 2014.

[73] R. K. Pandey, P. K. Pandey, and O. P. Agrawal, "Sturm's theorems for generalized derivative and generalized Sturm–Liouville problem," *Mathematical Communications*, vol. 28, no. 1, pp. 141–152, 2023.

[74] F. Jarad, T. Abdeljawad, and K. Shah, "On the weighted fractional operators of a function with respect to another function," *Fractals*, vol. 28, no. 08, pp. 2040011, 2020.

[75] K. Kumar, R. K. Pandey, and F. Sultana, "Numerical schemes with convergence for generalized fractional integro-differential equations," *Journal of Computational and Applied Mathematics*, vol. 388, pp. 113318, 2021.

[76] R. Buschman, "Decomposition of an integral operator by use of mikusiński calculus," *SIAM Journal on Mathematical Analysis*, vol. 3, no. 1, pp. 83–85, 1972.

[77] M. M. Meerschaert and F. Sabzikar, "Stochastic integration for tempered fractional brownian motion," *Stochastic processes and their applications*, vol. 124, no. 7, pp. 2363–2387, 2014.

[78] F. Sabzikar, M. M. Meerschaert, and J. Chen, “Tempered fractional calculus,” *Journal of Computational Physics*, vol. 293, pp. 14–28, 2015.

[79] H. Zhang, F. Liu, I. Turner, and S. Chen, “The numerical simulation of the tempered fractional black–scholes equation for european double barrier option,” *Applied Mathematical Modelling*, vol. 40, no. 11-12, pp. 5819–5834, 2016.

[80] E. Hanert and C. Piret, “A chebyshev pseudospectral method to solve the space-time tempered fractional diffusion equation,” *SIAM Journal on Scientific Computing*, vol. 36, no. 4, pp. A1797–A1812, 2014.

[81] A. Kullberg and D. del Castillo Negrete, “Transport in the spatially tempered fractional fokker–planck equation,” *Journal of Physics A: Mathematical and Theoretical*, vol. 45, no. 25, pp. 255101, 2012.

[82] J. Deng, L. Zhao, and Y. Wu, “Fast predictor-corrector approach for the tempered fractional differential equations,” *Numerical Algorithms*, vol. 74, pp. 717–754, 2017.

[83] P. K. Pandey, R. K. Pandey, S. Yadav, and O. P. Agrawal, “Variational approach for tempered fractional Sturm–Liouville problem,” *International Journal of Applied and Computational Mathematics*, vol. 7, no. 2, pp. 51, 2021.

List of Publications and Communicated Papers

- **E. Goel**, R. K. Pandey, S. Yadav, O.P. Agrawal, A numerical approximation for generalized fractional Sturm-Liouville problem with application, **Mathematics and Computers in Simulations**, 207, (2023), 417-436.
- **E. Goel** and R. K. Pandey. Approximation and convergence of generalized fractional Sturm-Liouville problem via integral form, **The Journal of Analysis**, (2024), 1-22.
- **E. Goel**, R. K. Pandey, A non-uniform approximation for fractional Sturm-Liouville problem with generalized fractional derivatives (Communicated).
- **E. Goel**, R. K. Pandey, Higher order tempered fractional Sturm-Liouville problem: Transformation in integral form and numerical approximation (Under Preparation).