A DIFFUSIVE REPRESENTATION APPROACH TO FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract. Fractional calculus is a powerful mathematical framework for modeling complex systems across fields such as physics, engineering, and finance. However, the numerical computation of fractional integrals and solving fractional differential equations presents significant challenges due to the non-local nature of fractional operators, leading to high computational and memory costs in traditional methods. In this study, we explore innovative variations in diffusive representations specifically designed for fractional integrals, aiming to reduce computational complexity and memory usage. By integrating schemes like the Gauss-Laguerre quadrature scheme and kernel compression, we develop enhanced numerical methods for solving fractional differential equations.

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References

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