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Direct transcription methods based on fractional integral approximation formulas for solving nonlinear fractional optimal control problems

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Highlights

- A general class of fractional optimal control problems was considered, which contains the bang-bang, free final time and path constraints problems.
- Fractional integration matrices of Grunwald-Letnikov, trapezoidal and Simpson's formulas are derived.
- Using fractional integration matrix, the fractional optimal control problems are reduced to a finite-dimensional optimization problem.
- In order to improve the speed and accuracy, the gradient of objective function and the Jacobian of constraints are supplied for optimization solver.
- Numerical simulations are provided to illustrate the presented method on different types of fractional optimal control problems.

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