Seminar
Systems and Control Group - CIDMA

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Departamento de Matemática, Universidade de Aveiro

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Numerical solution of fractional optimal control problems using modified hat functions

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Abstract

In the present work, a numerical method based on the modified hat functions is introduced for solving a class of fractional optimal control problems. In this scheme, the control and the fractional derivative of state function are considered as linear combinations of the modified hat functions. The Riemann-Liouville integral operator is used to give approximations for the state function and some of its derivatives. Using the properties of the considered basis functions, the fractional optimal control problem is easily reduced to solving a system of nonlinear algebraic equations. An error bound is presented for the approximate optimal value of the performance index obtained by the proposed method. Then the method is developed for solving a class of optimal control problems with inequality constraints. Finally, some illustrative examples are considered to demonstrate the effectiveness and accuracy of the proposed technique.

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