Iterative design of variable fractional-order IIR differintegrators

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Abstract

In this paper, the variable fractional-order (VFO) differintegrator is designed based on IIR-typed Farrow structure. The stability of the designed VFO IIR differintegrator is achieved by incorporating a constrained function into the objective error function. But the minimization of the original objective error function is a highly nonlinear problem, so an iterative quadratic method is proposed to overcome it. Comparing with the design based on FIR-typed Farrow structure, several designed examples, including a VFO differintegrator, a pure VFO differentiator and a pure VFO integrator, are presented to demonstrate the effectiveness of the proposed method. © 2009 Elsevier B.V. All rights reserved.

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