

Commutativity of Fractional Order Linear Time-Varying Systems

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Abstract : The paper studies the commutativity associated with fractional order linear time-varying systems (LTVSs), which is an important area of study in control systems engineering. In this paper, we explore the properties of these systems and their ability to commute. We proposed the necessary and sufficient condition for commutativity for fractional order LTVSs. Through a simulation and mathematical analysis, we demonstrate that these systems exhibit commutativity under certain conditions. Our findings have implications for the design and control of fractional order systems in practical applications, science, and engineering. An example is given to show the effectiveness of the proposed method which is been computed by Mathematica and validated by the use of MATLAB (Simulink).

Keywords : fractional differential equation, physical systems, equivalent circuit, analog control

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