Einladung zum Oberseminar Dynamische Systeme und Kontrolltheorie

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A Stability Testing Algorithm for Incommensurate Fractional Differential Equation Systems

This work presents a new method for determining whether a system of fractional-order differential equations is stable. We specifically focus on the incommensurate case, where each individual equation in the system can have its own unique order, independent of the others. Analyzing stability for these types of systems is normally challenging, because standard tools only work easily when all equations share the same order. Currently, the only existing method to test these incommensurate systems is highly complicated. Our new algorithm answers the stability question in a way that is much simpler, and more practical to implement than previous approaches. In this work, we look closely at linear problems where the ratios of the equation orders are rational numbers. We show how our method turns a difficult problem into a much simpler matrix eigenvalue problem, which allows the computer to save both memory and runtime. We also explain how well-known mathematical techniques can be used to easily extend our findings to more complex, nonlinear problems with completely arbitrary orders

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Zu diesem Vortrag laden wir Sie herzlich ein.

gez. Sergey Dashkovskiy