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عنوان مقاله:

Stability for coupled systems on networks with Caputo–Hadamard fractional derivative

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خلاصه مقاله:

This paper discusses stability and uniform asymptotic stability of the trivial solution of the following coupled systems of fractional differential equations on networks\begin{equation*} \left\{ \begin{array}{l1l} ^{cH}D^{\alpha} x_{i}=f_{i}(t,x_{i})+\sum\limits_{j=\}^{n}g_{ij}(t,x_{i},x_{j}),&t> t_{۰}, \\ x_{i}(t_{۰})=x_{i۰}, \end{array} \right. \end{equation*} where ^{cH}D^{\alpha} denotes the Caputo–Hadamard fractional derivative of order \alpha , ۱<\alpha\leq ۲ , i=\,۲,\dots,n, and f_{i} :\mathbb{R}_{+}\times\mathbb{R}^{m_i} \to \mathbb{R}^{m_i} , g_{ij} : \mathbb{R}_{+}\times \mathbb{R}^{m_i}\times \mathbb{R}^{m_j} \to \mathbb{R}^{m_i} are given functions. Based on graph theory and the classical Lyapunov technique, we prove stability and uniform asymptotic stability under suitable sufficient conditions. We also provide an example to illustrate the obtained results.

کلمات کلیدی:

Fractional differential equation, Caputo–Hadamard, Coupled systems on networks, Lyapunov function

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