

Global Mittag-Leffler Stability of Fractional-Order Bidirectional Associative Memory Neural Network with Discrete and Distributed Transmission Delays

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Abstract : Fractional-order Hopfield neural networks are generally used to model the information processing among the interacting neurons. To show the constancy of the processed information, it is required to analyze the stability of these systems. In this work, we perform Mittag-Leffler stability for the corresponding Caputo fractional-order bidirectional associative memory (BAM) neural networks with various time-delays. We derive sufficient conditions to ensure the existence and uniqueness of the equilibrium point by using the theory of topological degree theory. By applying the fractional Lyapunov method and Mittag-Leffler functions, we derive sufficient conditions for the global Mittag-Leffler stability, which further imply the global asymptotic stability of the network equilibrium. Finally, we present two suitable examples to show the effectiveness of the obtained results.

Keywords : bidirectional associative memory neural network, existence and uniqueness, fractional-order, Lyapunov function, Mittag-Leffler stability

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