

Global vs. Local Stability of Recurrent Neural Networks as Vector Equalizer

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Abstract:

Recurrent neural networks (RNNs) are well known for their capability in minimizing suitable cost functions. Therefore they are used to solve classification and optimization problems in many scientific disciplines. This can be done because they are stable in the sense of Lyapunov. A RNN can be globally or locally stable depending on the fulfilled inherent stability conditions. When using a RNN in an optimization task, the global stability is in general preferred to avoid spurious responses or local minima. In this paper, we present some stability results (global and local) of the RNN (continuous-time and discrete-time) and we discuss the global and local stability issues on the basis of a RNN vector equalizer. We analyze also the impact of the stability conditions on the performance of the RNN vector equalizer.